American Journal of Public Health
and THE NATION'S HEALTH

Volume 28 January, 1938 Number 1

An Equal Opportunity for Health*

THE HONORABLE HERBERT H. LEHMAN
Governor of the State of New York, Albany, N. Y.

SIXTY-SIX years ago, on April 18, 1872, New York City became the birthplace of this Association, when your founders first met here to formulate the basic principles of public health coöperation which have now permeated the nation. You have honored both the city and state of your birth by coming home from time to time so that we can rejoice in your splendid progress.

Now, in your maturity, we welcome you home once again.

You may recall that the late Stephen Smith, your distinguished first President, who only a few years ago died at the age of 99—placed the normal duration of human life at 100 years instead of the biblical span of three score and ten. The practical realism of Dr. Smith's prophecy is revealed in the fact that since 1900 ten whole years have been added to our life span.

It is my firm conviction, often repeated, that so far as science and government can make it possible, an equal opportunity for health is the right of all citizens of the community, regardless of circumstances, birth, economic conditions, geographical limitations, race, creed, or color.

Public interest in hygiene and health can be made effective only when it can be concentrated in the carrying out of a definite plan. This plan should be subject to continuous revision so that full advantage may be taken of both scientific and administrative improvements in the field of public health.

Definite plans require expert preparation and supervision, with official recognition of the maxim that the health of the people is indeed the highest law.

I am proud to be able to say that during the past quarter century the State of New York has recognized the full logic of the statement made in 1913 by that eminent physician and humanist, Sir William Osler, when he said: "Were the health of the people made a question of public and not of party policy, only a skilled expert could possibly be appointed as a public health officer, not, as is now so often the case, the man with the political pull."

Suffice it to say that the guidance of the public health activities of the State of New York since 1914 has been in

* Presented to the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 5, 1937.

the hands successively of Hermann M. Biggs, Mathias Nicoll, Jr., Thomas Parran, and now Edward S. Godfrey, Jr., all eminent practitioners of your profession and appointed solely on the basis of their outstanding technical and personal achievements in the field of public health.

The record speaks for itself. In 1913 the death rate in the state for all communicable diseases was 419 per 100,000 population; in 1936 it was 151—a decrease of 64 per cent. Tuberculosis mortality has declined more than one-half since 1913; and the general death rate has declined almost 24 per cent. Both typhoid fever and diphtheria, once very prevalent, are now rare diseases both with a death rate of 0.5 per 100,000 population.

If the death rates of 1913 from these several causes had continued to prevail, there would have been in 1936, 48,000 more deaths from all causes in New York State. Of the infants now living, 11,300 would have died. Additional deaths from tuberculosis would have amounted to 12,400; typhoid fever, 1,300; and from diphtheria, 2,500.

That the economic condition of a community bears a very direct and potent relation to the health and welfare of its citizens is a conviction which has continued to grow upon me for many years.

In 1933 we were in the midst of an economic cataclysm that affected the well-being of every man, woman, and child, and threatened the security even of the state itself. Fear and panic were on every hand. Thousands were without adequate food, shelter, or work. Man was stunned and bewildered by forces which engulfed him and from which there appeared to be no escape. Man had lost hope. New York, like her sister states, had suffered in the midst of national and international adversity. Like all other governments, the State of New York faced the problem of fitting its aspirations of public service into the reduced limits of its treasury.

I said in 1933 and repeat now: "The significant thing is that financial considerations have not compelled us to waver too greatly from our ideals of the community services which the state must perform . . . essential protection for the security and well-being of our citizens still persists. I pray it will always continue to persist in our enlightened commonwealth."

Conditions during those trying days required immediate relief through emergency legislation and emergency administration.

Our laws quite simply recognized the responsibility of the state to provide food, clothing, shelter, and medical care for those who otherwise would be without it. In spite of decreased public revenue our state has maintained the lead among all others of the nation in the relief of the distress of unemployment. The legislature has appropriated state funds to help cities and counties give the necessities of life to those who were temporarily dependent through no fault of their own. At one time, more than one-sixth of the population of the state, including 800,000 or one-fourth of all our children, were provided with these necessities of life. The total expenditure of public funds in the state in nearly 6 years of public assistance, amounts to approximately one and one-quarter billions of dollars.

To achieve our goal of an equal opportunity for health and adequate medical care, we have emphasized that there must be an increasing degree of whole-hearted coöperation between public health officers, private physicians, and the welfare agencies of any community.

During the economic crisis, emergency action was necessary. We have

followed the famous advice given by John Hunter to his illustrious pupil, Edward Jenner, when he said, "Don't stop with thinking, try!" By both trying and thinking during the past 5 years, emergency action has become less and less necessary. Permanent social and economic reforms have been planned and executed.

Let me review for you some evidence of the ways in which this permanent protection is being developed for the health of citizens of New York State.

Since January 1, 1933, with my full support as Governor of this state, for a period of almost 5 years, a concerted attempt has been made to develop and provide for each locality an equality of opportunities for adequate public health and medical services.

The new activities and programs which have been undertaken or extended have not been stereotyped in pattern but have been sufficiently flexible so that new methods and administrative policies could be developed and tested—in the cold light of the effectiveness with which they provide adequate health services to the individual citizen and the extent to which they represent an efficient expenditure of public moneys.

The most significant new activity conducted by the Department of Health of the State of New York involves an unremitting effort to secure a thoroughgoing reorganization of local health services to the end that disparities might be eliminated and that the support of adequate services might be spread more economically over a larger tax base.

Conceivably the objective could be achieved in one of two ways—namely, by the promotion of county health departments with financial assistance from the state, or by the provision of necessary professional and technical services by the state itself through expansion of state health district activities. To eliminate the inadequacies and disparities in the town and village systems for health service, emphasis during the past 5 years has been placed upon both of these alternative methods.

My good friend, Thomas Parran, then State Commissioner of Health—now Surgeon General of the U. S. Public Health Service and President of your Association—in his annual report to me for the year 1934, said: "In spite of the material financial inducement to counties to organize health departments, little progress can be recorded in 1934. The present town and village system for health service is inadequate. The people in the rural areas are sorely in need of more effective health protection measures. If the counties, themselves, are unwilling with state aid to organize the health services, the only alternative seems to be for the state, itself, to operate many services heretofore considered a local responsibility."

Edward S. Godfrey, Jr., our present Commissioner of Health, said, later in the year 1935, in a public address: "I submit that local interest and support can be developed for a system of state districts each under a whole-time health officer as well as for a system of locally operated departments. Public health service always expresses itself locally, whether in services to an individual, a family, a group, or to a community."

The record shows my hearty endorsement of the practical suggestions made by these two outstanding public health administrators.

Now, in 1937, I am happy to announce the fruition of certain projects in which I have been deeply interested during my service as Governor. These include: The rebuilding of the State Reconstruction Home at West Haverstraw—to provide adequate and mod-

ern facilities for the treatment of remediable crippled children; the completion and opening of three new state hospitals for tuberculosis; the inauguration of expanded programs for the control of syphilis, pneumonia, and cancer; the better implementing of the District Offices of the State Health Department—for the development of broader and better local health services; and, the tremendous progress which has been made in the construction of needed sanitary improvements in the municipalities of this state during the past 5 years—under the stimulus of state and federal aid.

Today we have more than 12 million of our citizens resident in communities served by public water supply systems under the supervision of the engineers of the State Department of Health. With respect to the elimination of objectionable pollution in our own and neighboring states we have achieved more during the past few years than in the preceding three decades. More people are served by sewage treatment works constructed in this state since 1933, than are served by all such plants constructed prior to that date.

Sanitary supervision over some 3,000 camps, 3,000 summer hotels and 2,000 artificial swimming pools is doing much to safeguard the health of almost 3 million persons annually among the vacationing and traveling citizens of this and other states.

We point with pride to the pioneer work by our Bureau of Milk Control and other divisions of the State Health Department in the experimental development and practical application of the newly adopted phosphatase test, to determine the efficiency of pasteurization, which bids fair to revolutionize milk control policies throughout the United States.

Tremendous strides have been made by New York State during the past few decades in the reduction of deaths from certain causes by the application of principles of medical and sanitary science. Yet, in the light of present knowledge, much further improvement is obtainable.

An estimate by an eminent authority, Louis I. Dublin, of the Metropolitan Life Insurance Company, if applied to Continental United States, reveals a possible saving of about 600,000 lives every year, of whom about one-fourth, or 125,000, would be children in the first 5 years of life. One-tenth of this potential saving could be attained conceivably in New York State alone.

To achieve this goal, present local health services must be maintained; victories over specific diseases such as diphtheria, typhoid fever, and tuberculosis must be consolidated; and fresh and intensive attacks must be launched along new fronts.

I will refer briefly to a few of these new programs which have been close to my heart and have been made possible by the splendid coöperation of the Legislature.

I am reliably informed that 12,000 lives are sacrificed each year in New York State to the ravages of pneumonia. In January, 1936, I was happy to launch a state-wide campaign for pneumonia control—in which it was emphasized that although there are 32 types of pneumonia germs, Type I is by far the most common variety, and that the state was prepared to furnish a potent and reliable serum for its treatment. It had been shown that this serum could cut the number of Type I pneumonia deaths in half or even by two-thirds.

In the short period of 1½ years this demonstration, started jointly under private and public auspices, has shown the effectiveness of rapid and positive means of identifying pneumonia, and

has demonstrated that efficient antisera can be produced to combat certain of the more common types of the disease. I am informed by Dr. Godfrey that the use of Type I pneumonia serum produced by the State Department of Health has already saved many lives and has prevented serious, disabling complications in hundreds of others—thereby saving expense, suffering, and worry.

In the eyes of a progressive state these results made additional support for this life-saving program almost mandatory and, on April 24, 1937, I signed a legislative appropriation which made available to the State Department of Health, $400,000 for use in "Furthering and Promoting the Efficient Prevention, Diagnosis, Treatment, and Control of Pneumonia." I am told that under this new appropriation it soon will be possible to provide sera for the treatment of more than half of our pneumonia cases and that subsequent research should bring the total to nearly 100 per cent.

In 1936, syphilis was responsible for 87,350 cases and 1,258 deaths, reported in New York State, including New York City, and stood first in the number of cases among all the reportable diseases and was exceeded in deaths only by pneumonia and tuberculosis. Yet syphilis is a preventable disease for which specific treatment has long been known.

An intensive state-wide syphilis control program was started more than 2 years ago with the aid of added appropriations made by the 1935 Legislature. These and subsequent state appropriations together with federal assistance under the Social Security Act have put New York State well on the way to meet the challenge made by Dr. Parran, in his recent book, *Shadow on the Land*, when he said: "In not a single state of this country have we completely adequate free treatment even for the indigent."

Until very recently false modesty has interfered with a free discussion of syphilis. I am very glad to have had an active part in breaking the conspiracy of silence in New York State with regard to syphilis by public addresses on the subject and by my signature in May, 1937, of a law which changes the name of the Division of Social Hygiene in the State Department of Health to the "Division of Syphilis Control."

Early diagnosis and prompt treatment is productive of results not only in the treatment of communicable diseases such as tuberculosis, pneumonia, and syphilis, but also in the treatment of such a disease as cancer which was responsible for more than 19,000 deaths in New York State in 1936 of which almost half were in the state exclusive of New York City.

At a clinical congress of the American College of Surgeons some time ago it was stated: "If all the cases of cancer could be diagnosed early and treated promptly in their incipiency the annual number of deaths from this disease, now recorded as 150,000 in the United States and Canada, would be reduced by at least 33 per cent or 50,000 per year." In a special message to the Legislature on February 18 of this year I called attention to the lack of "available facilities for the treatment of those suffering with cancer . . . especially for those in the lower economic scale." I also said: "I am convinced that the people of this state do not wish these conditions to continue." This conviction on the part of both myself and the State Legislature with regard to cancer control has resulted in the appointment of a Temporary Cancer Commission and in an appropriation of $510,000 for the purchase of a site and the erection of

a 100 bed cancer hospital to implement and make more available to the citizens of the state the treatment and research facilities of the State Institute for Malignant Diseases in the City of Buffalo. Comparable action for all of the states has since been taken by the Congress and President of the United States.

To call attention to this problem and the need for educating the public to call a physician in time, once again I propose to designate by official proclamation the first week of November as "Cancer Crusade Week."

As we emerge from the depression, we must all solidify the gains we have won with so much difficulty. Some modifications may well have to be made, but, by and large, the essentials of the economic, social, and health reforms we have achieved, should remain as permanent fixtures in our body politic. With a true sense of public responsibility uppermost in the minds of all our people, we will recognize that, although the years to come will require other new changes and new plans—together we shall press steadily onward in our March of Progress.

Records Handbook

THE National Organization for Public Health Nursing has published a new handbook on records entitled, "Suggestions for Statistical Reporting and Cost Computation in Public Health Nursing," which supersedes the one prepared in 1932 by a joint committee of that organization and the U. S. Children's Bureau.

There are two sections, the first on the statistical report of public health nursing services, and the other on computing the cost of a visit. The definitions, instructions, and tabulation forms in the first section conform with those approved by the State and Territorial Health Officers, the U. S. Public Health Service, and the U. S. Children's Bureau in 1936, which are included in *Reprint No. 1768* from *Public Health Reports*. Also, the report form has been planned to make the data with reference to public health nursing service, required for the American Public Health Association Appraisal Forms, available.

The methods described for determining the cost of the nursing visit, while not applicable in their entirety to the nursing service rendered by public agencies, will be of interest to health departments contemplating studies of such cost.

The handbook can be ordered from the National Organization for Public Health Nursing, 50 West 50 Street, New York, N. Y., at 25¢ per copy.

The Familial Aggregation of Infectious Diseases*

WADE H. FROST, M.D., F.A.P.H.A.

Professor of Epidemiology, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

ONE of the most characteristic features in the epidemiology of the common acute communicable diseases is the grouping of cases in time and space; and this is especially apt to be noted in the group which constitutes a household, people in close contact with each other, sharing a common environment, mostly of close kinship, and usually under the eye of at least one medical or lay observer whose observation encompasses the whole group. It might be supposed, then, that we would have unusually full knowledge and exact records of intrafamilial concentration of infectious diseases. And it is true that much of what we know about the communicability of certain diseases, and the special conditions related to exposure, susceptibility, and immunity is derived from observation on their spread —or failure to spread—in attacked families. It is also true that it has long been customary, even in rudimentary discussions of the epidemiology of communicable diseases, to give some account of the frequency and sequence of multiple cases within the family. But notwithstanding the tremendous mass of observations and literature bearing upon the concentration of communicable diseases within the household, our knowledge of the subject is still, for the most part, diffuse and unorganized.

This is due partly, perhaps chiefly, to the fact that the observations which have been reported have been presented in a variety of different forms, usually incomplete, and not readily convertible to a common basis. For instance, one observer will report the number or proportion of families in which more than 1 case occurred, while another will report the proportion of all cases in the community which occurred in families with more than 1 case. Both of these forms of statement are obviously incomplete, and neither is convertible into the other. A better, though less common, form of statement is the number of families having 1, 2, 3, . . . etc. cases; but this is of limited significance unless the material is further classified to show the distribution of families by size, and the presentation then becomes cumbrous.

Such systematic knowledge of the subject as we have today we owe largely to Dr. Charles V. Chapin, to whom we are indebted not only for furnishing the most extensive data as yet available on three communicable diseases—scarlet fever, diphtheria, and measles—but even more for having de-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 5, 1937.

veloped and introduced the simplest, most direct, most widely applicable and useful method so far devised for assembling the essential facts. The development of this method is only a detail in Dr. Chapin's classic studies of the epidemiology of communicable diseases; but it is a detail which is so intimately related to the whole plan and purpose of his work, and has been so widely useful, that it has seemed to me of interest to follow his approach to this particular way of summarizing experience.

The method which Dr. Chapin used for quantitative description of familial aggregation, a method which, so far as I have been able to ascertain, was introduced by him,* is the so-called "secondary attack rate"; that is, the attack rate, within a specified time, in members of attacked families exclusive of the "primary" case, time being reckoned from the onset of this case. The method itself is familiar; but before discussing its history it may be appropriate to call attention to its special merits—simplicity, and adaptability to a variety of uses.

The facts required are simple. They are, essentially: the date of onset of the first case in each family; enumeration of the other persons present in the household at the time; and record of the dates of onset of such additional cases as occur among them within a specified time from onset (or recognition) of the first case. It is useful and customary to add further facts about the primary cases, their household associates, and the cases among them, in order that the secondary attack rate may be related to such circumstances as the character and management of the first case, the sex, age, and previous history of others in the household, various details of their habits, movements and environment, and perhaps their kinship to the primary case. In addition to being simple and readily obtainable with fair accuracy, these facts are all of the kind essential for guidance of administrative authorities in their management of cases of communicable diseases.

Given the essential facts, their compilation for derivation of secondary attack rates is equally simple. It is necessary only to set up an array of the exposed persons, that is, in each family, all those present exclusive of the primary case, classified by sex, age, or other conditions which it is desired to take into account; to set up parallel arrays of the cases occurring in each group within specified time limits dating from onset of the first case in each family; and to calculate the secondary attack rate as a simple ratio between cases and exposed persons in each class. It is, of course, necessary, in any particular study, to adopt certain definite rules which may have to be more or less arbitrary, or to follow established conventions, in such matters as the definition of a "primary" case, the period of time for which the secondary attack rate is to be calculated, etc. These, however, are merely the elaboration in detail of what is essentially an altogether simple procedure; and the same may be said of the devices which must be employed in application of the method to chronic diseases or to frequently recurring infections such as the common cold.

The secondary attack rate has the further merit that it yields information in terms which are simple and directly related to the practical problems of the health officer. The question or series of questions which it answers directly is: given a case of communicable disease in the family, what is the

* It is of course impossible to be certain that this method had not been used and presented in some earlier publication; but the evidence available to me indicates pretty clearly that Dr. Chapin devised the procedure to meet his own needs, and it is certain that its general use in this country derives from his work.

risk of attack borne by others in the same household within specified periods of time, and how does this risk vary with the character and management of the original case and with the sex, age, past history, and various other circumstances of those exposed? It is upon the answer to these questions that the health officer must base his decisions as to the kind and duration of protective and restrictive measures which are required for the protection of the family and the public.

In addition to its quite obvious usefulness in giving a direct answer to practical questions of this kind, the secondary attack rate has broader significance in contributing to better understanding of the natural history of communicable diseases, especially the directly transmitted endemic infections for which the human host is obligatory. For such diseases the secondary attack rate gives the best approximation we have to the limits of incidence of the clinically recognized disease—or equally of the sub-clinical infection where it can be independently observed—in a group subjected to almost certain physical exposure to the infective agent. More extended knowledge of these limits is of fundamental importance, not only for comparison of one disease with another, but equally for comparing the manifestations of the same disease in different areas and different periods of time.

It is also of interest to ascertain the ratio of the secondary familial attack rate to the currently prevailing attack rate of the same disease in the general population; and this is readily done because the two rates may readily be reduced to the same time basis and are otherwise directly comparable. The interpretation of this ratio is not simple, but it clearly is an index of the focalization of disease or infection around the recognized clinical case, and has interesting if somewhat elusive implications with respect to the relative frequency of clinically manifest cases of the disease as compared with concealed carriers of infection at large in the community.

Those who have found the secondary attack rate ready-made, having become familiar with the procedure before they have encountered the problems to which it applies, are apt to think that because it is so simple and direct it must have suggested itself immediately in the study of infection in families. But in epidemiology, as in other fields, the procedures which are at the same time simplest and most efficient are not often the ones which suggest themselves first. The direct approach to any problem is only one of many possible approaches, most of which are indirect; and there is an adage which reminds us that the appropriate method is most likely to be invented when it is needed to achieve a definite result. This appears to be the history of Dr. Chapin's development of this particular method. So far as may be judged from the methods which he actually used in assembling his data, it appears that he first used this particular form of statement when his investigations had raised a quite definite and specific question which could be answered only in terms of the secondary attack rate.

The record from which this is inferred, fortunately an unusually full record, and the only one to which I shall refer, is the series of annual reports rendered by Dr. Chapin as Superintendent of Health of the City of Providence, R. I., beginning with the first year of his incumbency, 1884, and followed through 1905, beyond which, for present purposes, it is not necessary to go. In these reports Dr. Chapin gives and discusses, year by year, a series of tables presenting his observations on various aspects of the epidemiology of scarlet fever and

diphtheria. These, taken in sequence, give an objective record of the specific problems taken up and of the data and methods used in attacking them.

In the first paragraph of the first report of the series, for the year 1884, following a comment to the effect that health departments probably are devoting too large a share of their attention to the abatement of nuisances, Dr. Chapin expresses the belief that "there is no doubt that more attention might well be given to the prevention of the more common infectious diseases and more time devoted to their scientific investigation," and following this, he notes the need of a medical inspector for this purpose. The report for the next year announces the appointment of Dr. Gardner T. Swarts as Medical Inspector, and among his duties, listed in detail, specifies:

> To visit every case of contagious disease which is reported to this office . . .
>
> To obtain as much information in regard to the cause of the disease as possible and to keep a record of all cases on blanks which, when returned to this office, are there kept on file.

It is of interest that the report of the Medical Inspector for this year gives the following somewhat unusual table, which includes in one group cases of scarlet fever, diphtheria and typhoid fever:

Whole number of cases reported	387
Number of premises inspected	321
Extra number of cases on same premises	66

Beyond the suggestion which this table gives of a special interest in the spread of contagious disease within the family, there is little in the first three reports to indicate the particular lines of investigation to be pursued. These are revealed, however, in the report for 1887. Here Dr. Chapin mentions that he has "collected some facts in regard to cases of scarlet fever occurring during the latter part of last year, which, perhaps, are not of much value in themselves but may be when the number of cases can be increased." This marks the beginning of systematic tabulations of certain facts about scarlet fever, continued in substantially the same form for more than 20 years, adding to the numbers each year. Dr. Chapin's discussion, in the 1887 report, of the data on scarlet fever collected that year, indicates pretty clearly the kind of facts collected and the specific questions which they were intended to answer. These, however, are indicated as clearly and somewhat more succinctly in the table given below which first appeared in the report for 1888 and was continued thereafter for many years in nearly the same form. For convenience of reference the table as reproduced here is divided into 5 numbered sections. There is no such subdivision in the original, but in all other respects the table is precisely as shown here.

Each section of the table states by implication at least one definite question having reference to the frequency of the extension of scarlet fever to other members of the same family, or to other families in the same dwelling. Excepting the last question, which refers to frequency of attack in (susceptible) *individuals* following return to their homes, the most direct answers which the data give to the questions are in terms of the proportion of *families* in which the extension occurs. The secondary attack rate in "susceptible children" (without further differentiation by age) may be derived very easily from the data given in section (1) of the table and would probably yield the most satisfactory answer to the general question there indicated. I think it will be granted, however, that given sufficiently extensive observation—which Dr. Chapin subsequently accumulated—all the specific questions proposed in the table

SUMMARY OF OBSERVATIONS ON SCARLET FEVER

From the

Sixth Annual Report of the Superintendent of Health of the City of Providence for the Year Ending December 31, 1888

(The table as printed is not divided into the numbered sections shown here.)

	1887	*1888*	*Total*
1			
Number of families in which there was more than one susceptible child	232	244	476
Number of these in which there was no second case	102	97	199
Number of susceptible children in all the above families	986	827	1,813
Number of these children who were attacked	452	511	963
2			
Number of additional families with susceptible children in the same house where the disease appeared	112	128	240
Number of susceptible children in these families	381	354	735
Number of these additional families attacked	27	16	43
Number of children in these families attacked	58	21	79
3			
Number of families where inunction was practiced	87	99	186
Number of instances in the above families where the disease was not confined to one case	44	64	108
Number of susceptible children in these families	218	496	714
Number of these children who were attacked	148	319	467
4			
Number of tenements which were fumigated	51	63	114
Number of instances where fumigation was done, and where the disease spread to other families in the house	5	5	10
5			
Number of instances where susceptible children were at once removed	24	18	42
Number of instances where they were attacked on their return	3	1	4

A susceptible child is defined as "one who has not had the disease"; and a footnote to the table explains that "two months is allowed to elapse before the family account is considered closed."

may be answered satisfactorily by analyses in the forms indicated. Use of the secondary attack rate would have been preferable in some of the analyses; but in none is it obligatory.

The same report, for 1888, gives, for the first time, in incomplete form, a table which, in various more complete forms, is continued thereafter for many years. It refers to attacked families, and shows, by single years of age, up to and including age 20 (all above this age being grouped together as adults):

(1) "Number exposed," *i.e.*, the whole number of persons of indicated age present in the families, including both primary and secondary cases

(2) "Number of cases," without distinction between primary and secondary

(3) "Ratio of cases to number exposed," expressed as a percentage

Inclusion of the primary cases among the number of "exposed" is unfortunate.* It makes the ratio of cases to people "exposed" exceedingly difficult to interpret, and in fact Dr. Chapin himself appears at times to

* The persons first attacked in their families have of course been "exposed" to the specific infection of scarlet fever; but, having come into the table *because* of having scarlet fever, they are not exposed to the risk of contracting it within the time to which the table refers. The failure to distinguish between these two meanings of "exposure" makes the table confusing.

have misinterpreted it. Nevertheless, this form of tabulation has a definite and useful place in the sequence leading to subsequent use of the secondary attack rate. It requires only dissection of the basic data to yield secondary attack rates; and, as it stands, it gives useful information as to age distribution.

Beginning in 1889, the reports include tabulations for diphtheria equivalent to those which have been mentioned for scarlet fever; and from 1896 separate tables are given for diphtheria in families where the diagnosis was bacteriologically confirmed.

In 1903 an important addition is made to the series, namely, a table relating to scarlet fever and a similar one for diphtheria, showing, for a considerable period of years, the number of secondary cases distributed according to time of onset in days from onset of the primary case in the family. The age distribution of secondary cases is not given in these tables.

It is in the report for 1903 that Dr. Chapin first makes use of the secondary attack rate. Since 1891 an increasing proportion of cases of diphtheria and scarlet fever had been removed each year to the hospital for contagious diseases; and the question which brings in the use of the secondary attack rate is that of the resultant benefit to other members of the families from which the primary cases had been removed.

Referring first to diphtheria, Dr. Chapin gives a table showing, by age, the number of persons left at home in the families from which primary cases were removed to the hospital. Among the 1,420 persons included in this group, 55 were attacked subsequent to removal of the primary case. The specific question asked is: how many cases of diphtheria might have been expected in these 1,420 people if the primary cases had remained at home? This, as he notes, requires the calculation of age-specific secondary attack rates—*i.e.*, attack rates in members of the family *exclusive* of the primary case—in families where the primary case remained at home. No table was available giving the full data required for calculating these rates, namely, (1) the age distribution of persons in attacked families exclusive of the primary cases, and (2) secondary cases at each age. However, a table (A), which has been mentioned heretofore, gives the aggregate number of secondary cases (1896–1903), not separated by age; and another (B) gives, by age, the number of people present in attacked families, the number of cases, and the ratio of cases to people. Referring to these two tables, Dr. Chapin observes that the secondary cases constitute about 40 per cent of all that occur, hence he takes 40 per cent of the ratios shown in table (B) as representing approximately the secondary attack rates. Applying these rates to the corresponding age groups of the population left at home, and making an ingenious adjustment for the varying intervals from onset of the primary case to removal from home, he estimates that had these patients remained at home their familial contacts might have been expected to suffer an incidence of about 120 cases instead of the 55 actually recorded. The same method is then applied in estimating the "expected" as contrasted with the observed incidence of diphtheria in well persons who removed from their homes subsequent to the onset of the primary cases; and similar estimates are made with respect to scarlet fever.

Two years later, in the report for 1905, appears the first table giving age-specific secondary attack rates for males, females, and both sexes combined. It refers to diphtheria, including only families for which the diagnosis was bacteriologically confirmed, and includes data for the full

decade 1896–1905. As the table is given here it is necessary to refer to another table for some basic data used in calculating the rates, but with this reference it is complete. Later, the form and arrangement of the table were altered at various times, bringing the data together in more convenient form. Beginning in 1908, tables are added showing secondary attack rates in scarlet fever; and in various subsequent reports special tables are given showing separately the secondary attack rates in families where the patient lived (that is, recovered) and remained at home; in families where the primary case was removed to a hospital, and in families employing servants or nurses. In general, these tables refer back to dates considerably earlier than the dates of the reports in which they first appear, and the figures given are large.

This review has followed only one particular line of Dr. Chapin's studies, the one which led to use of the secondary familial attack rate. No attempt has been made to follow through the many other lines along which his investigations of scarlet fever and diphtheria extended; and space does not permit even their enumeration here. Most of the specific questions investigated did not require use of the secondary attack rate and had already been answered by other methods and in other terms before this form of statement had been adopted. When a specific question eventually arose definitely requiring this method, the essential data had already been provided, and the method itself cannot have been far below the surface.

National Foundation for Infantile Paralysis

FOLLOWING his recent announcement of the establishment of the National Foundation for Infantile Paralysis, President Roosevelt has issued a statement of the appointment of 34 citizens of various parts of the United States to serve as trustees.

It is hoped that a fund of from 7 to 10 million dollars will be raised in the next 5 years, with which the Foundation "will make every effort to ensure that every responsible research agency in this country is adequately financed to carry on investigations into the cause of infantile paralysis and the methods by which it may be prevented. . . ." It also aims to develop means of enabling those already crippled by poliomyelitis to become economically independent in their own communities.

All funds collected through the celebration of the 5th annual "birthday ball," held January 29, 1938, in honor of the President's birthday January 30, will be given to the new Foundation, instead of being divided as heretofore between the Georgia Warm Springs Foundation and local communities.

A State Cancer Program*

HENRY D. CHADWICK, M.D., F.A.P.H.A., AND
HERBERT L. LOMBARD, M.D., F.A.P.H.A.

Commissioner of Public Health; and Director of Adult Hygiene, State Department of Public Health, Boston, Mass.

AN Act establishing the first permanent state board of health in the United States was signed in Massachusetts on June 21, 1869. The keynote of the fullest interpretation of the term "public health" was inherent in this first beginning and the beginnings from which it, in turn, sprang. This law mentioned the 4 important activities of health departments: (1) vital statistics, (2) communicable disease control, (3) epidemiology, (4) sanitation. The first chairman of the board, Dr. Henry I. Bowditch, began his first report [1] with his comprehensive concept of public health. In part he said:

> No board of health, if it rightly perform its duty, can separate the physical from the moral and intellectual natures of man. These three qualities of man are really indissoluble, and mutually act and react upon each other. Any influence exerted to the injury of one, inevitably, though perhaps very indirectly, injures another. As in the physical world there is a correlation of forces, so that no force is ever lost, but only interchanged with another, so do these various powers and qualities of man act upon each other, and act and are acted on by the physical forces of nature that surround him.
>
> By the careful and comprehensive study of these various laws and of their relations, the highest department of the physician's art is brought into operation. But no man or private body of men has the ability to study and to develop this department as a free commonwealth can do when acting through the agency of a few persons who are devoted to this object, and who come willingly to the work, and armed with the power and the ample means of the state. Hence the term "State Medicine," though criticised by some, becomes a most appropriate and terse expression of the position which our Commonwealth has now assumed. . . . The State Board of Health . . . will adopt the fine old maxim, pagan though it be, that nothing which pertains to humanity, in its widest sense, will this board deem foreign to its aims.

This seemingly visionary prediction has been realized in the increased responsibilities which the Legislature has placed upon official public health.

Cancer was first mentioned officially by the Massachusetts Health Department in the annual report in 1896. A legislative decision to have the situation studied statistically resulted in 1900 in Whitney's classic report on cancer statistics.[2]

The only other official act of the Health Department until the inception of the program in 1925 (aside from yearly statistical mention and an occasional lecture) was the establishment of a tumor diagnostic service in 1919.

Independent groups led by physicians, clergymen, and others, began to take action, first in one part of the state and then in another, seeking assistance for the local cancer problem. Eventually, these several independent currents of interest blended into one broad common channel, and by 1921 the state-wide coöperation of a majority of the medical profession, together with the interested clergymen and lay-

* Read at a Special Session of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 5, 1937.

men, unique as far as can be ascertained, manifested itself: first, by stimulating an intensive study of the whole state cancer situation, with all its multiple variables and, second, by sweeping into law a program comprising the five salient recommendations of the study.

Thus, the cancer program came into existence with state-wide acclaim and enthusiasm. The real secret of its persistent popularity probably lies in the feeling on the part of so many individuals that they had a hand in its inception. It should be mentioned that some physicians, including the Commissioner of Health at that time, questioned its place in a health department. Their opinions were recorded, but were overruled by popular sentiment.

The early years of the cancer program witnessed the opening of the state cancer hospital at Pondville, the organization of 12 cancer clinics in the several parts of the state, educational work of a general type, and statistical research. At the beginning of any program, constant appraisal and revision is necessary before the most satisfactory working plan is evolved. After 8 years of operation under the original schedule, in 1934 the Commissioner met with an interested group and discussed a reorganization of the whole cancer program. The revised plan has been in effect for 3 years, and the results justify a belief in its effectiveness.

It is significant that the introduction of this program focused the attention of the department for the first time on chronic disease. This, however, was a logical development of health service. The great reduction in the morbidity and mortality from gastrointestinal diseases of infancy and childhood and the acute communicable diseases, and the aging of the population, have placed chronic disease in the forefront, taking its toll of two-thirds of total deaths from all causes in Massachusetts. A department of public health must keep in step with these fundamental changes and readjust its activities to meet the problems incidental to an older population.

A state health department has the organization to bring together all the factors and factions that should be engaged in a cancer program to the end that continuity of effort and coöperation of patient, physician, and health official may be assured, and the resources of the state made available to wage a campaign against a disease that in Massachusetts is causing one-eighth of all deaths at the present time. As a cause of death, cancer has but one superior—the cardiovascular group.

The cancer program in Massachusetts has 5 main features:

1. A tumor diagnostic service
2. A state hospital for the treatment of cancer
3. Diagnostic clinics
4. Education of physicians and the laity regarding cancer
5. Statistical research for the evaluation of the problem.

TUMOR DIAGNOSTIC SERVICE

A tumor diagnostic service is maintained by the department in conjunction with the Harvard Cancer Commission. Any physician or hospital may have suspected tissue examined to determine the presence or absence of cancer.

STATE HOSPITAL FOR THE TREATMENT OF CANCER

The Pondville Hospital, with 145 beds, is maintained by the Commonwealth exclusively for the treatment of cancer. A new ward of 50 beds is nearly ready for occupancy at the Westfield State Sanatorium in the western part of the state. Patients with cancer or suspected cancer of all

types and stages may be admitted to these hospitals provided they have been in Massachusetts for 2 of the preceding 3 years and are certified for admission by licensed physicians. The charges for individuals able to pay are $10.50 per week; all others are hospitalized at no expense to themselves. Hospital charges to cities and towns for patients unable to pay their own fees are $2.50 per day. No additional charge is made for service or treatment. Diagnostic services are free in the out-patient clinic, while the charge for treatment is $1.50. Diagnostic, surgical, therapeutic, radium, X-ray (diagnosis and treatment), medical, and nursing services are available. An out-patient clinic for diagnosis and treatment is held on Thursday afternoon for new patients at 1 p.m. and old patients at 2 p.m.

From the inception of the plan for hospital treatment, it was recognized that great care would have to be exercised to prevent the institution from becoming known as a "Death House" or a home for terminal cases. To avoid this it was decided that only patients would be received for treatment of conditions that were susceptible of relief or in which there was a hope of cure. No patients were excluded if their sufferings could be mitigated by any form of treatment or whose lives could be prolonged by operation or radiation.

The stay in the hospital was strictly limited to the time necessary to carry out the treatment, and then the patient was discharged to his home or to another institution. This wise policy has resulted in keeping the period of hospitalization to a minimum and making the beds available to as many patients as possible. The average stay for each patient is approximately 36 days and, therefore, each bed is made to serve 10 patients per year.

When patients are discharged they are instructed to return to their physician for follow-up, or if they have no physician, to return to the out-patient department of one of the state-aided cancer clinics at regular intervals. A well developed social service keeps in touch with the patient or physician to see that recommendations made by the hospital staff are carried out. The plan entails reports as to the patient's condition as long as he lives, and complete records of progress are kept at the hospital. Periodically, the members of the staff summarize the cases of different types of cancer and evaluate the results of treatment. By this follow-up system, the patient is kept under constant supervision and, if it is necessary, may be returned to the hospital for further treatment without delay. The judicious use of radiation and alleviatory operations has lessened the sufferings of a large number of patients thought to be incurable, and many of them have been able to return to their homes to carry on some of their daily duties.

At the beginning of the cancer program, the department and many physicians were apprehensive that the cancer cases that went to the state hospital would simply lower the attendance elsewhere. This has been proved to be a groundless fear. In 1935 the state cancer hospital admitted 1,186 cases. In the same year, 81 other hospitals, comprising about three-fourths of the total hospital beds in the state, admitted 5,488 cases. These same hospitals in 1925 admitted 3,585 cases. The actual number of cancer deaths increased in the period of 10 years by 25 per cent, but the hospital admissions for cancer, including the state cancer hospital, by 86 per cent. Apparently, the intensive cancer program has increased the attendance at the hospitals.

DIAGNOSTIC CLINICS

A method for providing adequate medical care by augmenting the re-

sources of the individual physician, rather than by supplanting the physician himself, has been tried in the Massachusetts Cancer Program. The cost of X-ray, radium, metabolism tests, cardiograms, and certain laboratory procedures is far in excess of the ability of the man of low income to pay. By furnishing such diagnostic procedures when needed, a form of socialized medicine is introduced which benefits both the physician and his patient and obviates more drastic change. It has been stated that every individual should not have medical care and treatment because every individual cannot afford it, but who is to determine which man's life is to be saved and which lost because of lack of money which, in itself, is often the result of an economic system over which the individual has no control.

In the Massachusetts Cancer Program the state furnishes a hospital and 20 clinics. Every physician in the Commonwealth may bring or send his patient to one of these clinics for free consultative service. If the case requires such a diagnostic procedure as extensive X-ray, this will be paid for by the patient if he is able and by funds available for this service if he is not. Each patient is referred to the physician who sent him to the clinic and the physician decides whether or not he desires further assistance in securing treatment for his patient. If he does, the state cancer hospital and the social service staff are at his disposal.

These 20 clinics are located strategically so that no person requiring an examination need travel more than 25 miles from home, at the most, to obtain it. These clinics are solely for diagnosis. The cancer clinics are administered by committees appointed by local medical organizations, which have charge of the administrative details connected with their respective clinics, but in all cases they must conform with the minimum standards set by the department. These are:

1. Group diagnosis—The group must consist of at least 3 men, preferably surgeon, pathologist, and radiologist. When any of these are not available, other physicians may be substituted.

2. Uniform records—Forms are furnished by the department for this purpose as is also money for clerical service when needed.

3. Social service—All cases of cancer and precancer are referred to social service for follow-up. The follow-up continues until death in the case of cancer and until removal of the lesion in the case of precancer. The state either furnishes money to help defray the expenses of the social worker or furnishes the clinic the services of a part-time social worker.

The clinics must meet at least twice a month. At intervals determined by the clinic committee, but in no instance less than 4 times a year, some form of teaching for the physician in the community is required. Most clinics perform this service by having consultants come to the clinics at stated intervals, while others conduct teaching clinics by members of their own staff.

The clinic itself is furnished the following services by the state: (1) advice, information, and literature; (2) funds for or services of social worker; (3) funds for travel of social worker; (4) funds for X-ray diagnosis for those unable to pay; (5) funds for teaching clinics; (6) funds for clerical assistance in clinics; (7) funds for postage, telephone, stationery, etc.; (8) special clinics for the staffs of the clinics; (9) reference of cancer cases to Pondville through social service.

The purpose of the clinics is to furnish physicians and the public, group consultation service in cancer, as well as to improve the knowledge of cancer among the medical profession and the laity. The group furnishes a diagnosis and outlines a plan of treatment for any person suspected of having cancer, regardless of financial status. Every

effort is made to have the family physician either come with his patient to the clinic or send the patient with such information as he cares to furnish. Any individual is admitted to the clinic, although it is preferred to have the patients referred by physicians so that any tendency to use the cancer clinic in order to establish a diagnosis of a condition originally not suspected of being cancer may be eliminated.

As the success of treatment is largely dependent on early diagnosis, that phase of the program is stressed in all the educational activities directed toward the profession or the public.

That the present type of clinic organization is meeting with coöperation from the physicians is attested by the fact that in the first 2 years of the clinics physicians sent 51.4 per cent of all cancer patients to the clinics and in the last 2 years (8 years later) 77.3 per cent. The percentage of cancer patients coming to the clinics on their own account, that consulted a physician but were not advised by him to go to one of the clinics, decreased from 33.9 per cent to 11.6 per cent, while the percentage that consulted no physician has dropped from 14.7 to 8.3.

The cancer patients who come to the clinics on their own volition come earlier than formerly. In the first period they waited 12.3 months, in the last period 8.6 months, which shows that education through newspapers, radio, etc., has accomplished something, but the 8.6 months' delay in the last 2 years is considerably greater than the 6.9 months' delay of patients who consulted physicians before coming to the clinics.

By due consideration of these various factors, it would appear that the improvement found in cancer clinics is about 80 per cent due to the physicians' efforts, and 20 per cent to an improved public consciousness of the disease. Although not satisfactory, this is far better than the reverse, for even if the public did not present itself at the cancer clinics until after the disease had been progressing for several months, it could be assured of much better treatment by the profession than it would have received 10 years ago.

RESEARCH

The studies have covered the volume of the problem; the existing hospital facilities in the state including the availability of radium and X-ray; the medical, social, and economic aspects of the disease; as well as such etiological findings as would be obtained by statistical analysis of death records, hospital records, and home visits to cancer patients. This work is continuing and reports are made on new evidence as it is acquired.

EDUCATION

The field of health education is at present in an elementary stage. For 30 years personal hygiene has been the subject of much popular discussion. On the whole, this has been based on fads and hearsay rather than on the results of scientific research. There are several experiments being conducted at present attempting to find a solution to this problem of disseminating knowledge. Scientific medicine is years ahead of its popular application. The problem is to present it in such a way that the individual will act upon the knowledge he receives. The backwardness in applying knowledge may be the result of an unfortunate tendency to talk generalities on the assumption that real knowledge is over the heads of the general public. If a disease and the present state of knowledge concerning it are explained in a clear way, the public responds with understanding and intelligence.

The reception of the Coöperative

Cancer Control Program in Massachusetts is the best and most recent example of this. If exact knowledge were discussed about cancer and the specific resources available were made known, the present percentage of cures would be nearly tripled in this state of more than 350 communities with a population of nearly 4,500,000, and over 7,000 physicians. Each town and city in the Commonwealth has been or is being organized into a small Coöperative Cancer Control Committee for the dissemination of this exact knowledge. Already 220 Coöperative Cancer Control Committees have been organized with results beyond any expectations. Every club, or even every small group of individuals which meets regularly, is asked to have a meeting on cancer once a year. The local physician is asked to meet with this group and discuss cancer and answer questions. This is the crux of the whole plan. At these small group meetings the public is informed of the relationship of chronic irritation to cancer, of the percentage of cures of the disease, of the fallacy of the cancer folklore, and the danger of the cancer quack. All physicians are participating in this program by giving these talks and answering questions. By teaching in this way, many practitioners are acquiring a better personal knowledge.

Another reason for the success of this plan is that it includes every group in the Commonwealth. The social, fraternal, racial, religious, military, political, and service groups are all represented. This is more than a cross-section. It is the whole population of the state. The influx of patients to physician and clinic following meetings of this sort shows that the information is being not only disseminated but acted upon.

The results of this method of education are already apparent. In 1936 the interval of delay between the first recognizable symptoms of cancer and first consultation with a physician showed, in Massachusetts, a decrease of nearly 20 per cent. For 9 years prior to this, the interval had remained practically stationary.

If the 12 months of 1937 show the same tendency that the first 6 months have shown, this period of delay will be even less. There has been a big increase in attendance of cancer patients at 2 non-state-aided cancer clinics in Boston in 1937 which the authorities attribute, in both cases, directly to the state educational program.

In 1934 Bigelow and Lombard [3] published a paper showing that the cancer death rate increased for both sexes between 1900 and 1920, and that following 1920 there was no increase among females when allowances had been made for the changing age composition of the population. The table shown in this paper has been continued to include 1936. The years 1935 and 1936 showed a decline among females, with the rate in 1936 slightly lower than in 1935. The figure for the early part of 1937 points toward a continuation of this decline. This is particularly gratifying as it is another confirmation that the new program inaugurated in 1934 is producing tangible results. The male rate also may be responding to the program, although the evidence is not sufficiently marked to warrant any conclusions. Females have a greater number of accessible cancers and any improvement would be expected to show first in this group.

The effectiveness of the new cancer program is again demonstrated in the change in age at time of death. At the beginning of the program this was 63.3 years. In 1934 it had not improved, but in 1936 this figure had risen to 64.6 years. This indicates that lives are being prolonged as well as saved.

TABLE I

Massachusetts Age, Sex Adjusted Cancer Death Rates

Adjusted to Massachusetts 1900 Population

Rate per 100,000

Year	*Male*	*Female*	*Total*
1900	50.2	91.6	71.5
1901	50.6	93.7	72.7
1902	47.9	97.0	73.0
1903	50.9	97.8	75.0
1904	54.2	102.9	79.2
1905	55.5	103.7	80.3
1906	63.1	99.5	81.8
1907	58.9	108.7	84.4
1908	59.9	108.7	84.9
1909	60.3	108.5	85.0
1910	63.7	111.3	88.1
1911	68.8	112.1	91.0
1912	63.5	117.6	91.3
1913	71.5	119.7	96.2
1914	70.9	119.6	95.9
1915	73.7	119.5	97.2
1916	77.1	126.5	102.5
1917	76.2	127.0	102.3
1918	78.6	123.2	101.5
1919	77.9	120.5	99.7
1920	84.5	128.6	107.1
1921	85.9	129.4	108.2
1922	83.5	126.9	105.8
1923	85.4	125.8	106.1
1924	92.2	127.5	110.3
1925	89.6	130.0	110.4
1926	94.3	127.5	111.4
1927	92.5	128.9	111.1
1928	94.3	128.8	112.0
1929	93.3	127.4	110.8
1930	96.8	125.4	111.5
1931	93.5	126.2	110.3
1932	96.7	129.2	113.4
1933	101.5	128.7	115.5
1934	107.2	129.4	118.6
1935	99.2	125.2	112.5
1936	105.9	124.9	115.7

The physician is the key man in the Massachusetts Cancer Program. The whole program revolves around him, and both he and his patients are helped. In this way, his traditional position is unimpaired and the close relationship continues to exist between patient and physician. The majority of citizens in this country prefer to retain their own family physicians. On the other hand, they need services oftentimes involving expensive procedures beyond their reach financially. Any plan, to be successful, must try to meet the needs of these countless thousands for adequate medical care. The method to be adopted will have to be planned to make the burden on the taxpayer as light as possible. The Massachusetts Cancer Program is enthusiastically supported by both physicians and the public and for this one disease is meeting the needs of the people as they have never been met before.

REFERENCES

1. *First Annual Report of the State Board of Health of Massachusetts*, January, 1870. Wright & Potter, State Printers, Boston, 1870.

2. Whitney, W. F. Statistics of Cancer in Massachusetts. *Thirty-Second Annual Report of the State Board of Health of Massachusetts*, pp. 731–755. Wright & Potter, State Printers, Boston, 1901.

3. Bigelow, George H., and Lombard, Herbert L. Change in the Massachusetts Cancer Trend. *New Eng. J. Med.*, 210, 10:526–529 (Mar. 8), 1934.

Diabetes—An Important Public Health Problem*

CHARLES F. BOLDUAN, M.D., F.A.P.H.A.
Department of Health, New York, N. Y.

BECAUSE of the marked decline in the birth rate, due to birth control and to the cessation of overseas immigration, there has been a steady aging of our population. This has brought with it an increasing mortality of diseases associated with the higher ages, such as chronic disease of the heart, arteries and kidneys, cancer and diabetes.

As health administrators, we naturally study these conditions in the hope that we may find some means of preventing them, or failing which some means of prolonging life.

The work of Allen on the treatment of diabetes and especially the discovery of insulin by Banting and Best, in 1921, attracted wide attention to diabetes as a disease in which life could undoubtedly be greatly prolonged. But even then, health administrators appear not to have regarded diabetes as a condition toward whose control they should provide in their health program. Here and there writers called attention to the steady rise in the death rate of diabetes, and the suggestion was repeatedly made that it was the result of the rapidly increasing consumption of sugar.

In 1929 I began to devote special attention to the statistics of diabetes, and urged consideration of this disease as a public health problem. At first I too accepted the available statistics at their face value, but further study showed that this was misleading. I believe it will be helpful to review briefly the data which recent years have made available.

Because of the relatively uniform classification of New York City's mortality statistics over a long time, and because of the large population from which these statistics are drawn, I shall confine the discussion largely to conditions in New York City.

Taking the figures at their face value we appear to have a picture of diabetes mortality in New York City as shown in Table I.

Two features of this table deserve attention. First, note the rise in the death rate, from 2 per 100,000 in 1871–1875 to 30 in 1931–1935. Inasmuch as we know that prior to the introduction of insulin the case fatality of diabetes was high, the low mortality rates recorded in the earlier years would *seem* to indicate a very low prevalence of diabetes in New York City. The second point is the much greater rise in the mortality rate among females. During the earlier years, up to about 1900, the rates are approximately the same in the two sexes. Since then the diabetes mortality rate in females has risen much more rapidly than that in males, so that now it is more than double the male rate.

* Read at a Special Session of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 5, 1937.

TABLE I

Diabetes Deaths Reported, New York City, 1871–1935 Inclusive

	Average Deaths per Year			*Rate per 100,000 Population*		
	Total	*Male*	*Female*	*Total*	*Male*	*Female*
1871–1875	21	13	8	2	3	2
1876–1880	35	20	15	3	4	3
1881–1885	58	34	24	4	5	4
1886–1890	110	60	50	7	8	6
1891–1895	152	78	74	9	9	8
1898–1900	334	156	178	9	9	10
1901–1905	520	242	278	14	13	15
1906–1910	690	286	404	15	13	18
1911–1915	916	383	533	18	15	21
1916–1920	1,063	429	634	19	16	23
1921–1925	1,284	486	797	21	16	26
1926–1930	1,624	552	1,072	24	16	32
1931–1935	2,140	712	1,428	30	20	40

Why the rise in the mortality charged to diabetes? Why the approximately equal rates up to about 1900? What factor could have entered at that time to bring about so marked an increase in the death rate among females?

These are not academic questions and satisfactory answers are necessary in order that we may deal intelligently with diabetes as a public health problem.

The low mortality rates of the early years *seem* to indicate that there was far less diabetes then than there is now. But—

Was diabetes a rare disease? All the older medical textbooks speak of it as such. I am certain that this view is incorrect and that diabetes was very much more prevalent than the medical profession realized. The diagnosis of diabetes depends on the detection of sugar in the urine. Prior to 1850 this detection was largely by finding that the urine had a sweet, honey-like taste. Do you wonder that one of the textbooks says that it is a rather disagreeable test to make! Shortly before 1850 the Trommer and the Fehling chemical tests were introduced and are mentioned in textbooks published in the 60's and 70's. My study of the medical histories of New York Hospital shows that it was decades before these simple tests were routinely applied. If this was true of a first-class hospital, how frequently is it likely were tests of urine for sugar employed by private physicians? Even today how often is such an examination a regular routine for all cases? Let us start, then, by holding that diabetes was by no means a rare disease and that it was simply not diagnosed.

The sex distribution as shown in mortality statistics—All students of diabetes are agreed that diabetes is more prevalent among females than among males. Why do the earlier statistics show about equal mortality rates in the two sexes? A simple and wholly satisfactory answer to this is furnished by the manner in which a large proportion of the cases of diabetes were discovered during those earlier years, namely, purely by chance as the result of examinations for life insurance. Fifty or 60 years ago the proportion of women applying for life insurance was small. Hence, what cases of diabetes were detected through such insurance examinations were almost all among men. Even though diabetes was then, as now, more prevalent among females, its detection in those years was more likely among

males. Hence the nearly equal mortality rates in the sexes.

This view also affords a reasonable explanation for the mounting excess of the diabetes death rate among females during the past 30 or 40 years. Inquiries of a number of large life insurance companies revealed a marked increase in the proportion of applications for life insurance from females. Increases amounting to 20 per cent or more since 1900 were reported.

Increase in the diabetes mortality rate since 1900—Our mortality statistics indicate an increase in diabetes mortality in both sexes during the past 35 years. A very large proportion of this undoubtedly represents only a more frequent recognition of the disease, especially among females. Besides this, an increase now amounting to at least one-third over the 1900 rates is due to the aging of the population. In New York City, for example, the proportion of the "45 years and over" group is more than one-third greater than it was in 1900. This is the age group which has by far the greatest proportion of diabetics. In New York City another fact must be considered, namely, the increase in the proportion of Jews in the population during the past 40 years. Diabetes appears to be from 50 to 75 per cent more prevalent among Jews than among non-Jews. In New York City, therefore, the marked increase in the proportion of Jews has also been a factor in the rising mortality of diabetes.

It is certainly highly significant that when due allowance is made for the aging of the population and the increasing proportion of Jews, the diabetes mortality rate in New York City among males shows a downward trend during recent years. If the explanations here advanced for the rising death rate among females are correct, we may expect the increase in females to continue for some time until the rate becomes stabilized at a point which represents approximately the relative prevalence of diabetes in the sexes.

I have dwelt so much on these statistical aspects of diabetes because their appreciation is necessary in order to keep us from following false trails. I am convinced that those who explain what they regard as a marked rise in diabetes mortality, are attempting to explain something which is not a fact. Bear in mind that I admit a *real* increase in the prevalence of diabetes because of the aging population. Beyond this, however, the increase indicated by the registered mortality is fictitious.

A number of writers, who apparently regard most of the increase in the recorded death rate of diabetes as real, see an explanation in a decrease in physical labor because of labor-saving machinery, and an increase in the prevalence of obesity. Among the arguments advanced, mention is made of the lower diabetes mortality rates among rural and urban populations, it being pointed out that there is generally more physical labor among the rural dwellers and that their diabetes death rates are distinctly lower. I believe that the chief and perhaps the only reason for the lower diabetes rates in rural populations is the greater extent of the medical services in urban areas, and that it is again a question of recognition. I also consider it farfetched to conclude, because *recorded* diabetes mortality rates are higher among farm owners than among farm laborers, that the difference is due to the lesser amount of physical labor among farm owners. Surely farm owners, as a group, enjoy much better medical service than do the farm laborers. Finally, what evidence is there that there has been an increase in the prevalence of obesity, a statement often

made as though it were an established fact? I have attempted to obtain information as to the prevalence of obesity a generation ago and now, by personal interviews with, and data secured from manufacturers of shirts and collars, large clothing manufacturers, and makers of women's clothing. All those interviewed had quite definite opinions that there had been no increase in the prevalence of obesity. Unfortunately, in no case was it possible to secure actual figures over a sufficiently long period to make comparisons. In this connection, bear in mind that the mortality statistics seem to indicate an increase in diabetes limited to women. What facts support the alleged increased prevalence of obesity in women? Have not just the past 20 or 30 years been characterized by the vogue of the slim, boyish figure? Were slimming treatments ever before so popular as during the past quarter century?

Most experienced clinicians agree that there is a relationship between obesity and the development of diabetes. From what I have said, however, it should be clear that an alleged but improbable increased prevalence of obesity cannot be advanced to explain the rise in diabetes mortality. In males, having in mind the aging population, there is, I believe, no increase to explain; in females, present rates one-third higher than in 1900, are satisfactorily accounted for by the aging population, and increases beyond this are much better explained by increased recognition of the disease in women.

Prevalence of diabetes—Inasmuch as diabetes is not a reportable disease, we have no ready means of determining its prevalence. This difficulty is increased by the fact that many cases are unrecognized. Thus, even in a city like New York, where medical facilities are abundant, a survey conducted a few years ago by the Academy of Medicine, embracing 1,600 cases of diabetes in 24 large hospitals, disclosed that in over one-sixth of the cases the diagnosis of diabetes had not been made before admission of the patient to the hospital.

A survey of chronic illness conducted in Massachusetts several years ago indicated that there were some 15,000 diabetics in that state. Joslin states that in 97 per cent of these individuals the condition had been diagnosed by physicians. This very high percentage leads one to believe that the total number of diabetics was substantially larger than that calculated from the survey findings, for, as just mentioned, the disease often remains long unrecognized.

Examinations of the urine of a large random sample of the general population would give valuable information as to the prevalence of diabetes. To be of value one would require the sample to consist of a sufficiently large number, male and female, in each of the important age groups. Thus far, so far as I know no such survey has been made, for it is an enormous undertaking. I made an attempt along this line some years ago, securing information regarding the percentage of persons with definite glycosuria among the new admissions to state hospitals for mental disease. The data were obtained from these hospitals because I knew of no correlation between mental disease and diabetes. Data from general hospital services would necessarily have included individuals who were admitted because of a diabetic condition. My survey embraced a total of only 3,685 persons, a number too small to yield more than a suggestion as to the prevalence of diabetes in the city's population. The percentages obtained in this study indicated that in New York City there might be as many as 100,000 diabetics.

That this approximate figure may

not be far from the facts, appears from the studies made by the New York Diabetes Association. These indicated that in one year there were about 8,000 patients attending diabetes clinics, and over 7,000 patients treated, as bed patients, in hospitals. A questionnaire sent out by the Health Department to all the physicians in the city elicited replies from 4,000 physicians who, altogether, were caring for 8,000 private patients having diabetes. This ratio of 2 diabetics for 1 physician may not hold for all the 15,000 registered physicians, but the number of private diabetic patients must run into the thousands. Besides the patients thus estimated, there is a considerable number of diabetics who are entirely unaware of their disease and therefore not under treatment, and also some who are treating themselves with patent nostrums. There is reason to believe that the total number of diabetics in New York City is not far from 1 per cent of the population, and it is probably conservative to estimate the diabetics in the United States as over 600,000. In any event the number is so large that the condition deserves wide attention as an important health problem.

Causative factors—Priscilla White and her associates have brought forward considerable evidence that heredity is an important factor in diabetes. Joslin emphasizes the rôle of obesity in the development of the disease in those with a diabetic ancestry. Mosenthal feels that pregnancy is often an exciting factor in the development of diabetes, citing my New York City figures which show nearly treble the diabetes death rate among married and widowed women over 45 years of age than among single women of the same age. Recent investigations disclose the important part played by endocrine disturbances in the development of diabetes. With all this newer knowledge medical science has not yet unraveled the ultimate cause of diabetes.

Despite this ignorance as to the cause of diabetes there is much that can and should be done in dealing with diabetes as a health problem, for experience has shown that with the aid of insulin the lives of diabetics can be greatly prolonged. Many diabetics are now enabled to live out a normal life span, and do this while attending to their daily affairs like normal, non-diabetic individuals. To achieve this for as large a number of diabetics as possible should be the goal of our efforts. How shall we bring this about?

A practicable program—While the health authorities may well take the lead, they will need to enlist the coöperation of the medical profession, the hospitals and clinics, and the welfare agencies. Inasmuch as New York City was the first to organize an attack on diabetes as a public health problem, let me give a brief sketch of our work.

In 1932, at the request of Dr. Shirley W. Wynne, at that time Commissioner of Health, the New York Academy of Medicine appointed a special committee to study the problem of diabetes and make recommendations for dealing with the situation. The report of this committee, presented by the chairman, Dr. H. O. Mosenthal as the Hermann M. Biggs Memorial lecture in 1933, suggested the formation of a committee or association with a paid secretary, suitable office facilities, and a modest budget for necessary expenses. The functions of the proposed organization were enumerated as follows:

To act as a clearing house for the study of diabetes as a health problem, and to devise measures for the control of this disease.

To assist in the formation of a committee of clinics dealing with diabetes.

To stimulate more effective coöperation between clinics and hospitals in the treatment of diabetes.

To develop more extensive and more continuous graduate courses of instruction for physicians.

To carry on health education of the public in all matters pertaining to diabetes.

To assist in the preparation of exhibit material which can be used in the instruction of diabetics attending clinics.

To attempt a solution of the problem of providing insulin to the indigent.

To study the needs of the various parts of the city to the end that adequate facilities for diagnosis and treatment may be generally available.

To extend our knowledge of diabetes by the interchange of views at suitable meetings.

To train groups of nurses, as so usefully done by Joslin, in the special nursing of diabetics.

In New York, thanks to financial support provided by Lucius N. Littauer, this program was put into effect by the organization of the New York Diabetes Association in 1934. The work has been very successful and has led several other cities to organize programs along similar lines.

Today, with the chronic diseases of later life steadily assuming greater importance as health problems, diabetes deserves special attention. In none of the other diseases in this category have we such certain prospects of success in helping the victims live out a normal life span.

Pneumonia Service in New York

JOHN L. Rice, M.D., Commissioner, reporting on the first week's activities of the New York City Health Department's pneumonia service, stated that 69 specimens had been typed and 665 vials of serum supplied.

Plans are now being perfected by the Department of Health in coöperation with the Pneumonia Advisory Committee to conduct refresher courses for physicians in the serum treatment of pneumonia. Such courses will be conducted in hospitals in each of the boroughs. In the near future the days, hours and location of the courses will be announced to the medical profession.

Allocation of Deaths

A PAPER by Miss Elizabeth Parkhurst, senior statistician, State Department of Health, Albany, New York, U. S. A., printed in the *American Journal of Public Health* (July, 1937), raises afresh the question of the allocation of deaths of citizens outside the area of their residence. In Britain we have had for many years a fixed convention that every death, whatever its cause or nature, shall be accredited to the usual place of residence of the deceased, whatever may be the length of time which has elapsed since the deceased left his native town. Residence is the place where the deceased had his home and to which he would be expected to return should he return at all. This system has several disadvantages and some absurdities, but it has the immense advantage of being definite; so we all know where we are, even if we find ourselves in an uncomfortable or incongruous position. In the United States there is no federal allocation of deaths and the various States have either no system of allocation at all, or local and various systems, all differing from ours. Miss Parkhurst, in her paper, pleads for a system more logical than ours, but in avoiding some of our difficulties, it introduces others which, though rather less incongruous, appear to us more formidable obstructions to smooth working. . . .

Everybody agrees that some method of allocation is essential everywhere, but it is most necessary in the States where more people die in institutions than they do here, and where many institutions are outside the districts they serve. The Americans tell a story of a small town in which the number of deaths from typhoid exceeded the entire population. The American ideal that deaths should be allocated to the districts in which the cause of death operated is higher and more logical than ours and seems not much more difficult to reduce to practice. It is an absurdity that if the women of a small village go to a maternity home in a neighboring town and die there from an outbreak of puerperal fever, the village, which was innocent, should be saddled with a high maternal mortality rate. Or, if the people of the same village go for a joy ride and meet with disaster, that their deaths should be laid on the village from which they set out. On the other hand, how are we to allocate the death of a person from dysentery who has long been resident in a mental hospital? Britain being a small and compact country with a central executive and a uniform health code, the absurdities of our system of registration are theoretical rather than real, for we have ready means of detecting them. In the United States, with its vast area and different population distribution, its division into semi-autonomous States with different health codes, it is not easy to check these absurdities; so we can understand why the Americans look upon our system as too faulty for their adoption. Miss Elizabeth Parkhurst's proposal is to adopt our system except that deaths from acute communicable disease occurring in institutions should not be referred to the place of former residence. This has been advocated by many British hygienists, but it is replete with difficulties. — *Medical Officer* (London), LVIII, 14 (Oct. 2), 1937.

Determining Population in Intercensal and Postcensal Years by Means of Continuous Population Registers*

DOROTHY SWAINE THOMAS, PH.D.

Director of Research in Social Statistics, Institute of Human Relations, Yale University, New Haven, Conn.

THE resident population of a given area at any point of time after a census enumeration can be determined by adding or subtracting the net change in numbers since the last enumeration. This net change is obviously a function of the number of persons entering and departing from the area. Entrance to a resident population group occurs when children are born to residents or when persons migrate into the area and establish residence. Departure occurs when residents die or migrate out of the area. The determination of net change from the last census enumeration to any specified point of time requires the drawing of a balance sheet for the interval, indicating on the positive side, the number of births to residents and the number of persons migrating into the area, and on the negative side, the number of residents dying and the number migrating out of the area.

The theoretical requirement for such a balance sheet is continuous registration, not only of births and deaths at the time of their occurrence and with proper allocation to the residence area, but also of all persons establishing and giving up residence in this area. This requirement is met by the continuous system of population registers, now existing in Sweden, The Netherlands, and certain other European countries. The principles of registration in Sweden and The Netherlands are the same, although they differ in regard to details. The Swedish system has the following features:

1. The smallest local administrative unit, the parish or the community, is the unit for population registration.

2. The pastors of the State Church (functioning, however, as civil servants) are responsible for keeping the registers.

3. The basic register is a so-called community book which is revised after each decennial census. In this book data are arranged in terms of household groups, indicating for each resident his family and given names, sex, relationship to the head of the family, birth place and birth date, civil status at the time of inscription, religious affiliation, nationality and citizenship, occupation at inscription, address in the community and place of previous residence, if an in-migrant from another Swedish community or an immigrant from a foreign country.

4. Changes affecting civil status or citizenship are recorded for those who

* Read at Joint Session of the American Statistical Association and the Vital Statistics Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

continue as residents. A new entry, containing all the above details, is made for every child born to a resident woman and for all in-migrants or immigrants. Removal of the name from the register occurs upon emigration, out-migration, death or "disappearance," with an indication for out-migrants of the community of declared destination, and the date of the receipt of an attested inscription in the community declared as destination, or some other community.

5. Although registration is in terms of individuals, the household or family unit is preserved, and appropriate changes are made as the individual shifts from one household or family group to another within the community.

6. These registers represent the current resident population. Abstracts relating to all new inscriptions and removals are made in a series of books referring to births, deaths, and migrants, and summaries of these are prepared every year. Demographic occurrences affecting the factual but not the resident population are not recorded in the main community register, but appropriate notations are made in the birth register or death register, and a transcript is sent to the community of residence.

7. Residence is determined by fixed rules and definitions, depending initially upon the intention of the individual concerned, but revised in situations where intention does not correspond with fact. No one may be registered as a resident of more than one community at a time.

8. Every person intending to change his residence to another community is required to take out a migration certificate. A transcript of the demographic history and status of this person is sent to the community of destination, but his name is not removed from the register of the community of origin until a receipt attesting in-migration has been received from the community of destination. This is the so-called "closed" system of population registration: theoretically, no out-migration occurs except in connection with a subsequent in-migration. This rule is obviously applicable only to internal migrants.

9. Since civil rights, duties, and benefits are determined on the basis of registration as a resident, a person who evades registration is considered to have no such rights or benefits. An annual check of the registers, in connection with tax declarations, always reveals a certain number of persons who have disappeared from the community without taking out migration certificates, or who, after taking out certificates, and leaving the community, have failed to register elsewhere. Such persons are kept in the community registers for two consecutive years, but if their destination is still unknown at the expiration of the second year, they are declared to be statistically "non-existent" (obefintliga), are removed from the main register and are relegated to a special "Register of the Non-Existent" from which, in turn, they are removed only upon an attested in-migration or death in another community or upon return to the community in question.

10. Although registration is decentralized, control is centralized. Central registers are kept for persons having no defined local residence but considered nevertheless as residents of the country.

The Dutch system is, in principle, the same, but differs in the details of administration, personnel, and the technic of bookkeeping. The two fundamental points of difference from the Swedish system, are, first, that the registers are kept by civil officers, and second, and more important, that a

new "Family-Individual-Card" system has recently been introduced, whereby the card made out for each individual upon birth or immigration to the country is sent by post to the various communities of destination within the country, and thus contains a cumulative record of the individual's demographic experiences, which are recorded as they occur until his emigration or death, when the card is deposited in the Central Statistical Bureau. As providing a basis for determining the population in any administrative unit in intercensal or postcensal years, however, the system operates precisely as the Swedish, and a description of its details is not relevant to this paper.[1]

The essential features of continuous population registration common to the systems in Sweden and The Netherlands are: (1) there is a basic record of all residents determined at a census enumeration; (2) this basic record is subject to continuous revision by additions, subtractions, or modifications as changes occasioned by birth, death, marriage, dissolution of marriage, adoption, migration, and disappearance, occur; (3) there is a set of specific rules for determining residence; (4) the system is "closed" with respect to internal migration; and (5) civil rights, duties, and benefits are linked with registration.

The usefulness of the continuous register system in determining intercensal or postcensal population obviously depends upon the completeness and the promptness with which births, deaths, and migrants are registered. There seems to be very little doubt that both The Netherlands and Sweden maintain excellent control of the registration of births and deaths. In Sweden, the allocation of births to the community of residence of the mother is insured by a requirement that women entering maternity hospitals present their certificates of registration. The requirement of allocations to residence community however evidently causes some delays in completing the registration, and this situation tends toward an underestimate of population increase, for births outside the community, which should have been entered in the registers undoubtedly overbalance deaths of persons who should have been removed from the registers. Thus, even though omissions may be and probably are negligible in the long run, they may play a not unimportant rôle at any given point of time.

Control of migration registration presents greater difficulties than control of vital registration. It is particularly difficult to obtain a complete record of all emigrants from the country, since the "closed" system of registration can obviously not apply to

TABLE I

Internal Migrants

	Sweden [2]			*The Netherlands* [3]		
	In	*Out*	*In–Out*	*In*	*Out*	*In–Out*
1929	482,705	480,206	+2,499	488,781	489,421	—640
1930	526,166	523,674	+2,492	509,175	509,380	—205
1931	477,388	475,470	+1,918	439,843	442,167	—2,324
1932	481,479	478,938	+2,541	423,130	424,084	—954
1933	463,270	460,927	+2,343	414,877	415,196	—319
1934	471,704	469,221	+2,483	431,187	430,822	+365

(Average annual population, for these years, Sweden, about 6,180,000. Average population increase about 22,600.
Average population, The Netherlands, about 8,170,000. Average population increase about 115,000.)

emigrants. If the closed system were absolutely efficient in respect to internal migrants, the sum of the in-migrants, for the country as a whole, should equal the sum of the out-migrants, since, in theory, no out-migration can occur until an in-migration has been attested. Table I of in- and out-migrants for Sweden and The Netherlands in recent years shows the extent to which practice deviates from theory:

In Sweden the error is relatively constant and is always in the same direction, *i.e.*, a deficiency of out-registrations. If in-registrations could be taken as correct, under-registration of out-migrants would amount to about one-half of 1 per cent. In The Netherlands the differences have been proportionately less, reaching the Swedish level in only one of the years considered. The error is, generally, in the opposite direction, *i.e.*, an under-registration of in-migrants. It is impossible to know, however, the extent to which concealed compensating errors affect the total discrepancy, for two situations operate to produce the discrepancy: (1) The population registrar in the communities of destination may have neglected to notify the communities of origin that they have registered an in-migration, or the registrars in the community of origin may have neglected to delete an entry after receiving this notification. This will result in a deficiency of *out-migrants compared with in-migrants.* (2) Migrants who intended to seek a destination within the country, and took out migration certificates may have changed their minds and emigrated from the country. If the registrar in the community of origin has, nevertheless, recorded these cases as out-migrants, this will result in a deficiency of *in-migrants compared with out-migrants.*[4]

Thus, the total error may be considerably larger than the apparent discrepancy, due to a compensating factor. These errors are, however, of the sort that can be diminished by improved administration of the closed feature of the registration system.

Even if the closed system operated with perfect efficiency, and practice of the registrars conformed with theory to the extent that every registered in-migration had its corresponding registered out-migration, there might still be a considerable degree of under-representation of migration, due to the failure of some migrants to apply for registration certificates. Both the Swedish and the Dutch systems attempt a correction of this error by periodic checks of the registers. In so far as the decennial census is complete, the cumulative errors are eliminated after each census, and the annual checks remove as many as possible, but always with a time lag, for "disappearance" is determined only after a specified absence (in Sweden, 2 years) from the

TABLE II

	Sweden [5]			*The Netherlands* [6]		
	Reëntered in Community Book from "Book of the Non-existent"	*Removed from Community Book to "Book of the Non-existent"*	*Reëntries Minus Removals*	*Entered in Community Book "by Official Action"*	*Removed from Community Book "by Official Action"*	*Official Entries Minus Official Removals*
1929	6,729	7,257	—518	5,830	9,525	—3,695
1930	7,773	8,081	—308	6,251	14,885	—8,634
1931	6,140	5,865	+275	5,319	2,614	+2,705
1932	6,504	5,349	+1,155	4,560	4,449	+111
1933	6,154	4,892	+1,262	2,688	5,394	—2,706
1934	5,022	4,628	+394	1,830	4,430	—2,600

community. Table II shows the annual removal from and reëntries into the registers for the period 1929–1934.

The net effect of these entries and removals is not constant either in amount or direction. The census year 1930 shows the largest absolute figures for both entries and removals and in both countries. In addition to the relatively large correction of the registers at census years, the Swedish series over a longer period show that the fluctuations in the net figure are inversely related to the phases of the business cycle: it is an advantage to be registered as a resident during periods of depression, in order to obtain relief; it is an equal advantage to avoid registration during periods of prosperity in order to evade taxation! Furthermore, the effect of under-registration may operate differently with respect to rural and urban areas, for it is probable that the population in areas of maximum in-migration (*i.e.*, urban places) will be slightly underestimated in intercensal and postcensal periods, and the population in areas of maximum out-migration (*i.e.*, rural places) will be slightly overestimated.

The limitations of continuous population registers as sources for determining intercensal or postcensal population may be summarized as follows:

1. Errors in respect to births and deaths will depend upon the factor of delay in reporting extra-residential births and deaths to the residence areas. These errors will be relatively constant, and will result in a slight underestimation, particularly of rural areas which have no large maternity hospitals.

2. Errors due to under-registration of migrants will operate as follows:

   (a) A certain number of emigrants will escape registration entirely. This will cause a temporary overestimation of the population of areas of emigration.

   (b) Out-migrants (internal) may evade registration and this may cause temporary underestimation or overestimation of the population of the area affected. These errors are not constant and probably vary inversely with the business cycle, and probably also have a differential effect as between rural and urban areas, tending in general toward an overestimation of the former and an underestimation of the latter.

3. Errors due to incomplete registration of internal migrants will generally operate in

CHART I

SWEDEN: AGRICULTURAL POPULATION IN BLEKINGE, KRISTIANSTAD AND MALMOHUS COUNTIES

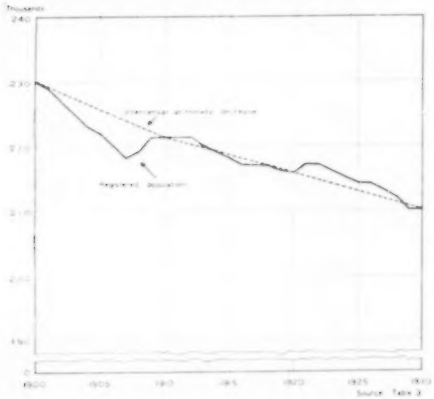
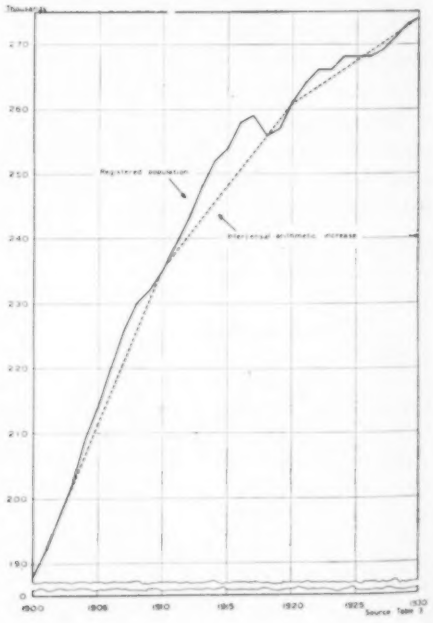


CHART II

SWEDEN: TOWN POPULATION IN BLEKINGE, KRISTIANSTAD AND MALMÖHUS COUNTIES.



the direction of an excess of in-migrants compared with out-migrants since these errors will be due to failure to maintain the closed system. The population of communities with inefficient removal of out-migrants from the registers will tend to be overestimated.

The net effect of all these errors will not be large if population registration is carefully controlled. The situation in The Netherlands and Sweden is favorable to such control, and it is possible that they have reached an irreducible minimum of errors. In Sweden these various errors are taken into account in determining postcensal or intercensal population. An *estimate* is made of total migration gain or loss which is added to natural gain or loss to determine total population change. The combination of an accurate census and a well controlled community register, thus goes far toward solving the problem of determining postcensal and intercensal population.

TABLE III

Sweden: Population in Two Specified Groups of Communities in Blekinge, Kristianstad and Malmöhus Counties (as of Dec. 31 of Each Year)*

	Agricultural Communities			*Towns*		
Year	*Registered Population (Thousands)*	*Calculated Intercensal Arithmetic Decrease*	*Per cent Deviation of Calculated from Registered*	*Registered Population (Thousands)*	*Calculated Intercensal Arithmetic Increase*	*Per cent Deviation of Calculated from Registered*
1900	*229.9*	*229.90*		*187.5*	*187.50*	
01	228.6	229.05	+.2	192.4	192.28	—.1
02	227.0	228.20	+.5	196.8	197.06	+.1
03	225.1	227.35	+1.0	202.3	201.84	—.2
04	223.1	226.50	+1.5	208.6	206.62	—.9
05	221.6	225.65	+1.8	213.7	211.40	—1.1
06	219.7	224.80	+2.3	219.6	216.18	—1.6
07	217.9	223.95	+2.8	225.7	220.96	—2.1
08	218.9	223.10	+1.9	229.6	225.74	—1.7
09	220.9	222.25	+.6	231.7	230.52	—.5
1910	*221.4*	*221.40*		*235.3*	*235.30*	
11	221.3	220.82	—.2	238.7	237.85	—.4
12	220.8	220.24	—.3	243.2	240.40	—.1
13	219.5	219.66	+.1	247.9	242.95	—2.0
14	219.0	219.08	+.0	251.6	245.50	—2.4
15	218.0	218.50	+.2	254.2	248.05	—2.4
16	216.9	217.92	+.5	257.7	250.60	—2.8
17	216.9	217.34	+.2	258.5	253.15	—2.1
18	217.3	216.76	—.2	255.5	255.70	+.1
19	216.2	216.18	—.0	257.0	258.25	+.5
1920	*215.6*	*215.60*		*260.8*	*260.80*	
21	216.9	215.02	—.9	263.7	262.14	—.6
22	216.5	214.44	—.9	266.1	263.48	—1.0
23	216.2	213.86	—1.1	266.4	264.82	—.6
24	214.7	213.28	—.7	267.5	266.16	—.5
25	214.1	212.70	—.7	268.1	267.50	—.2
26	213.8	212.12	—.8	267.7	268.84	+.4
27	213.4	211.54	—.9	268.8	270.18	+.5
28	212.0	210.96	—.5	270.7	271.52	+.3
29	210.4	210.38	—.0	272.8	272.86	+.0
1930	*209.8*	*209.80*		*274.2*	*274.20*	

* Unpublished tabulations (D. S. Thomas).

Before bringing this paper to a close, one further point should be made, and that is in regard to the strong cyclical movement in migration series, and particularly in the series representing net internal migration for relatively homogeneous areas. The cycles of migration gain which urban areas show during periods of prosperity and of migration loss (or diminished gain) during depression, when cumulated, may be sufficiently strong to produce marked cyclical fluctuations in the total population. Since censuses may fall at any phase of these cycles, it is extremely important to be able to describe this movement and measure the annual deviations, if intercensal or postcensal population estimates are to be used as bases for birth and death rates. The accompanying charts and tables (Table III, Charts I and II) show the extent of cyclical variations in the agricultural population on the one hand, and the town population on the other, in the most southerly tier of Swedish counties. Straight lines drawn between the population at consecutive census years indicate the fortuitous timing of census enumerations. When such strong population displacements occur, computed rates may be considerably in error unless cyclical variation is taken into account. The negative displacement of the line of arithmetical increase between the censuses of 1900 and 1910 amounts to 2.8 per cent for the agricultural communities at the cyclical maximum of 1907, and the same year showed a positive displacement of 2.1 per cent for towns although this percentage was exceeded during the war years when the line of arithmetical increase was 2.8 per cent above the observed value for 1916, and almost as great in the 2 preceding years. These population cycles are, of course, caused by the cumulative and combined action of cyclical variations in births, deaths, and migrations. Of these three variables, migration has played the dominant rôle in the particular series considered, and this situation is probably true, in general, of industrialized countries at the present time. Due to the strong age selectivity of migration, these series for total population by no means indicate the disturbance produced by cyclical variations upon specific age classes. I am at present assembling data on this point for a selected group of communities and, although the analysis has not been completed, there is evidence that the maximum cyclical displacement of the age groups 15–30 is several times as great as that of the total population. We are greatly in need of more complete and accurate information about selective migration and its temporal variations if we are to be in a position to allow for its influence upon population development in intercensal and postcensal population estimates. Until we have information of the sort derived from continuous registers, our estimates are likely to introduce serious errors in all vital indices.

In conclusion, it may be said that an efficiently controlled system of continuous population registers, combined with careful periodic enumerations of the resident population probably provides the best possible basis for reliable postcensal and intercensal population estimates. The operation of these systems in Sweden and The Netherlands has been described, and the sources and extent of the registration errors have been analyzed. Finally, the extent of cyclical variations in intercensal population, due largely to net internal migration, has been shown for selected Swedish regions and their implications for computing vital rates discussed. It is hoped that the experience of Sweden and The Netherlands may be taken as a guide for future American policy, for

our need of accurate population accounting is at least as great as theirs.

REFERENCES

1. For the details of this interesting experiment in population registration, see: Methorst, H. W., and Lentz, J. L. Population Administration and the Family-Individual Card System in The Netherlands. *Population*, 2:42–65 (Nov.), 1936.

Thomas, D. S. "The Continuous Register System of Population Accounting." In: *Problems of a Changing Population*. Report of the Committee on Population Problems. National Resources Committee (in press).

2. *Sveriges Officiella Statistik: Befolkningsrörelsen år 1933*, p. 1.

Sveriges Officiella Statistik: Befolkningsrörelsen år 1934, p. 1.

3. *Statistiek van den loop der bevolking van Nederland over het jaar 1934*, pp. 54–55.

4. This latter point was raised in connection with the German Meldestatistik in a report prepared for the Committee on Migration Differentials of the Social Science Research Council, by Fritz Meyer, of Kiel University.

5. *op. cit.* p. 1.

6. *op. cit.* pp. 54–55.

Appearing in February Number

Immunization Against Scarlet Fever Through Use of Formalinized Toxic Solutions
By Gaylord W. Anderson, M.D., Roy F. Feemster, M.D., Dr.P.H., B. Barrett Gilman, M.D., John J. Poutas, M.D., Leo Rane, Ph.D., Elliott S. Robinson, M.D., Ph.D., and Angeline D. Hamblen

Scarlet Fever Immunization
By Edwin H. Place, M.D.

The Health Department in the Field of Medicine—From the Standpoint of a Health Official
By Robert H. Riley, M.D., Dr.P.H.

Health Education for the Millions
By Louis I. Dublin, Ph.D., and Homer N. Calver

Syphilis Control in Industry
By R. R. Sayers, M.D.

Comparative Methods of Diagnosis of Rabies in Animals
By Charles N. Leach, M.D., C.P.H.

Epidemic Diarrhea of the New-Born*

III. Epidemiology of Outbreaks of Highly Fatal Diarrhea Among New-Born Babies in Hospital Nurseries

SAMUEL FRANT, M.D., F.A.P.H.A., AND
HAROLD ABRAMSON, M.D.

Epidemiologist and Director, Bureau of Preventable Diseases; and Field Epidemiologist, Department of Health, New York, N. Y.

ONE of the main objectives of the medicine of today is the prevention and control of disease. The accomplishment of this aim is dependent, of course, on a sound understanding of the epidemiological characteristics of disease entities and on the application of the fundamental principles of modern preventive medicine to their control. To a gratifying degree success has attended efforts to erect suitable barriers against the occurrence and spread of certain diseases, as for example, typhoid fever, smallpox, diphtheria, and tuberculosis. However, present methods for the prevention of diarrheal disorders are still singularly inadequate. The persistent prevalence of enteritis not only among adults, but more particularly among infants and children, remains a problem challenging concerted attempts at solution. The situation is further complicated by the fact that almost as rapidly as public health measures are elaborated against recognized forms of diarrheal disorders, new types arise and confound efforts directed toward the ultimate goal.

In the summer of 1934 an unusual number of deaths were taking place among normally delivered new-born babies in the nurseries of one of the general hospitals in New York. The infants were succumbing to a fulminating form of intestinal intoxication whose clinical course could not be stemmed by recognized methods of therapy. When the outbreak finally abated 72 babies had been attacked and 32 had died.

Since this initial outbreak, somewhat over 3 years ago, we have had the unusual opportunity of following 23 such outbreaks in 15 hospitals giving maternity care. The statistical data are shown in Table I, as well as the sequence of events in connection with these outbreaks. From July, 1934, to July, 1937, we have followed the postnatal course of 4,594 live-born babies delivered at the times indicated in the table.

Among these, 711 cases of the disorder are known to have developed with an attendant average morbidity rate of 15.5 per cent. Of the sick infants 335 died, the average mortality rate being 7.3 per cent of the infants exposed, and the case fatality rate 47.0

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

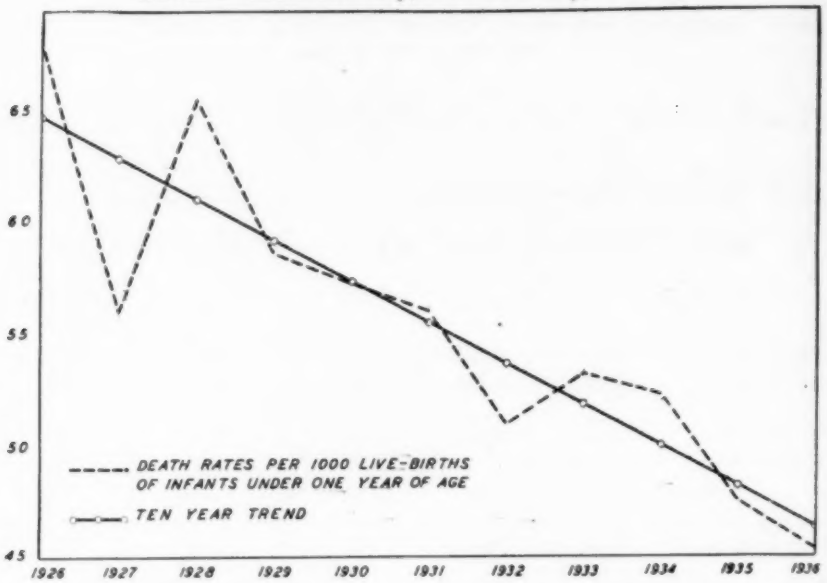
TABLE I

Chronologic Summary of Outbreaks of Epidemic Diarrhea of the New-Born in New York City from July, 1934, to July, 1937

No. Hosp.*	Borough	Dates of Outbreaks	Season	Total Number Live-born Babies	Total Number Cases of Epidemic Diarrhea	Per cent Morbidity	Total Number Fatal Cases	Per cent Mortality	Case Fatality Rate
1. A (1)	Queens	July-Sept. 1934	Summer	386	72	18.0	32	8.3	44.0
2. A (2)	Queens	Feb.-Apr. 1935	Winter-Spring	190	32	17.0	16	8.4	50.0
3. B	Brooklyn	Apr.-June 1935	Spring	520	58	11.0	23	4.4	38.0
4. C (1)	Bronx	July 1935	Summer	65	32	49.0	14	21.5	44.0
5. D (1)	Bronx	July-Aug. 1935	Summer	181	8	4.0	5	3.0	63.0
6. E	Bronx	Sept.-Dec. 1935	Fall	498	34	7.0	30	8.0	88.0
7. F	Manhattan	Oct.-Nov. 1935	Fall	41	18	44.0	0	0.0	0.0
8. D (2)	Bronx	Dec.-Jan. 1935–36	Winter	154	23	15.0	8	5.0	34.0
9. G (1)	Manhattan	Jan. 1936	Winter	63	29	46.0	7	11.0	24.0
10. C (2)	Bronx	Jan.-Feb. 1936	Winter	80	8	10.0	3	4.0	38.0
11. H	Queens	June-July 1936	Summer	79	28	35.0	17	21.5	55.0
12. I (1)	Brooklyn	June-Aug. 1936	Summer	226	43	15.0	21	9.3	49.0
13. G (2)	Manhattan	July-Oct. 1936	Summer-Fall	701	48	7.0	26	4.0	54.0
14. J	Manhattan	July-Oct. 1936	Summer-Fall	354	54	15.0	19	5.4	35.0
15. K	Manhattan	Sept.-Oct. 1936	Fall	91	14	15.0	11	12.0	79.0
16. C (3)	Bronx	Dec. 1936	Winter	43	4	9.0	2	5.0	50.0
17. L	Bronx	Dec.-Jan. 1936–37	Winter	28	10	36.0	3	10.0	30.0
18. M	Brooklyn	Dec.-Jan. 1936–37	Winter	229	34	15.0	29	13.0	85.0
19. N	Manhattan	Mar. 1937	Winter	128	52	40.0	16	12.0	29.0
20. I (2)	Brooklyn	Mar. 1937	Winter	66	24	36.0	7	11.0	29.0
21. O	Brooklyn	Mar.-Apr. 1937	Spring	56	12	21.0	5	8.0	41.0
22. G (3)	Manhattan	Apr.-May 1937	Spring	233	38	15.0	28	11.0	74.0
23. C (4)	Bronx	May-June 1937	Spring-Summer	182	36	19.8	13	7.0	50.0
			Totals	4,594	711	15.5	335	7.3	47.0

* The letters designate the various hospitals. The numbers in parentheses denote recurrent outbreaks in the same institution.

FIGURE I—Infant Mortality, New York City, 1926–1936



per cent. In addition to the above morbidity and mortality, there also occurred an incidental neonatal mortality of 32 per 1,000 live-births from causes other than diarrhea, as well as a still-birth ratio of 29.

As the events of the various epidemics were followed we were impressed by the fact that we were confronted with a novel clinical entity in new-born babies, characterized by marked diarrhea, intense dehydration, toxicity, and early death. In a preliminary paper with Rice and Best,[1] the essential clinical features of this disorder, "Epidemic Diarrhea of the New-Born," were summarized and the fact was stressed that despite extensive bacteriologic, serologic, and pathologic studies, the etiology still remained obscure. The literature afforded meager information on the problem, but in view of the many communications received by us, we are of the opinion that the disorder is of more frequent and widespread occurrence than reports indicate.

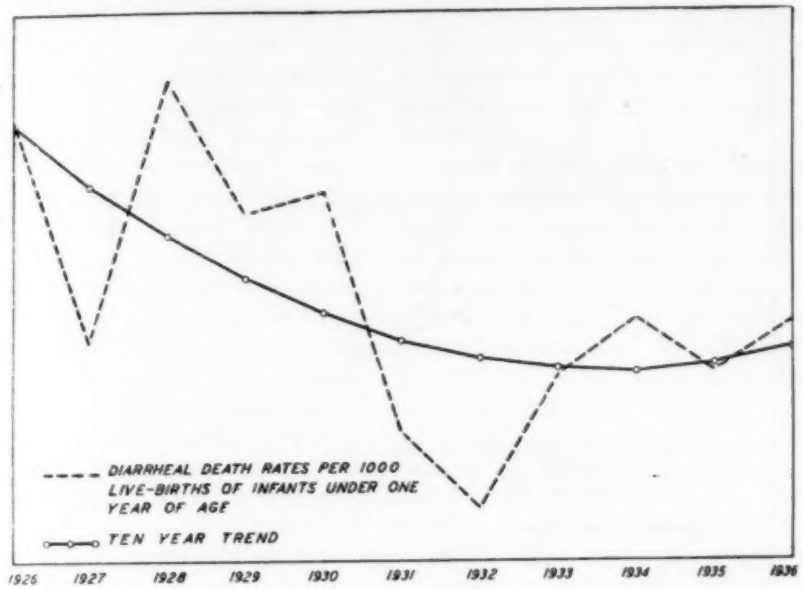
Indeed, the prevalence of this epi-

TABLE II

Seasonal Variations of Outbreaks of Epidemic Diarrhea of the New-Born

Seasons	Number Live-born Babies		Cases of Epidemic Diarrhea: Number		Cases of Epidemic Diarrhea: Per cent		Mortality: Number		Mortality: Per cent		Case Fatality Per cent	
Spring	1,086	2,551	160	394	14.7	15.4	77	189	7.1	7.4	48.1	47.9
Summer	1,465		234		15.9		112		7.7		47.8	
Fall	1,157	2,043	117	317	10.1	15.5	63	146	5.4	7.1	53.8	46.1
Winter	886		200		22.6		83		9.4		41.5	
Totals	4,594		711		15.5		335		7.3		47.0	

FIGURE II—Infantile Diarrheal Death Rates, New York City, 1926–1936



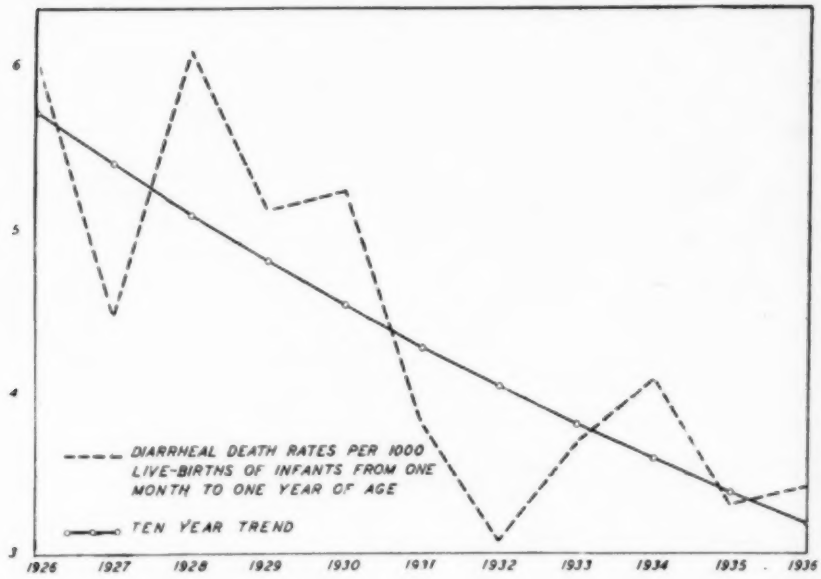
demic form of diarrheal disease among new-borns is reflected in New York City's infant mortality statistics. For the past 10 years or more, considerable attention has been directed by public health authorities toward the new-born period of life and particularly toward the evident failure to effect a substantial reduction in neonatal mortality. Rice and his collaborators [2] have shown that the death rates from all causes of infants under 1 year of age have steadily decreased during the past 20 years, but that when the general death rates of infants under 1 month are considered separately, exceedingly little has been accomplished in lowering mortality in this age group.

The death rate in the age group, 1 to 12 months, inclusive, has decreased 68 per cent (from 63.8 in 1916 to 20.7 per cent in 1935); that of infants in the neonatal period only 21 per cent (from 36.8 to 29.1 per cent). In this connection analysis of the neonatal death rates from the point of view of diarrheal disorders strongly indicates that the persistently high incidence of mortality among the newly-born is due in great measure to diarrheal disease. The curves in Figures I–IV illustrate this point clearly.

Figure I shows the constant downward trend 1926–1936 in infant mortality rates under 1 year of age. Figure II, representing diarrheal death rates during this same period of life, discloses a definite trend upward since 1932. But the curve for the age period 1 month to 1 year for diarrheal conditions displays a progressively descending trend (Figure III). Not so, however, with the curve in Figure IV, diarrheal death rates of babies under 1 month of age. Note the steady ascent in the trend in mortality for 1926–1936, and more especially since 1931–1932. These curves are a graphic indication of the importance of the previously unrecognized clinical entity "Epidemic Diarrhea of the New-Born," and its effect on New York City's infant death rate.

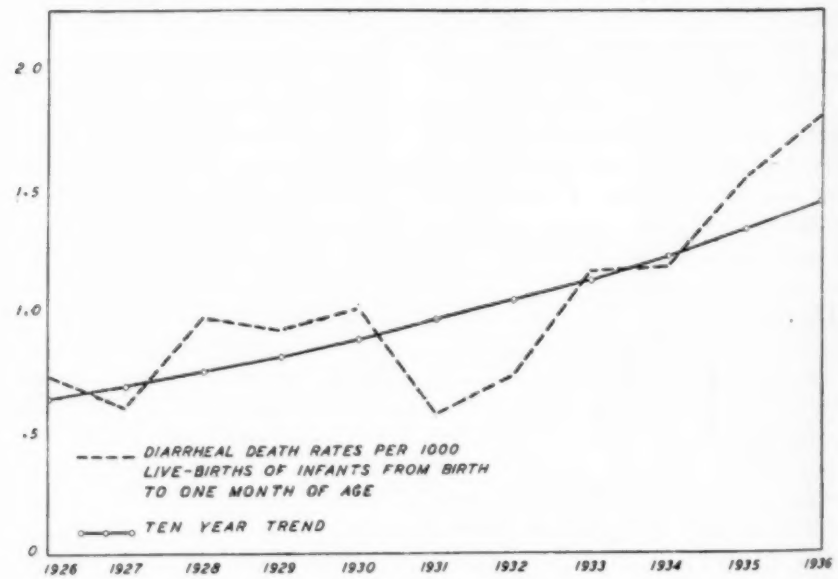
Epidemiologically this disease shows

FIGURE III—Infantile Diarrheal Death Rates, New York City, 1926–1936



the following characteristics: It involves specifically new-born babies during the first 3 or 4 weeks of life. No sex differences are present and, quite unlike the "summer diarrhea" of the past, but little variation is exhibited in morbidity and mortality from one season to another. The data indicate that the rates are lowest during the fall and highest during the winter. There is, however, no clear-cut rise in the fall-winter season, thus linking the

FIGURE IV—Infantile Diarrheal Death Rates, New York City, 1926–1936



disorder to respiratory infections prevalent at this period, nor in the spring-summer months so frequently associated with other diarrheal conditions. The spring-summer incidence is but little different from that of the fall-winter incidence; the mobility, mortality and case fatality percentages are practically the same (Table II).

From the few reports which have appeared[1] and from personal communications with the authors, it seems that geographically the disorder has thus far been recognized only in cities of the United States and in other countries lying within the North Temperate Zone.* With respect to feeding, no differences are evident in the incidence of the disease among either breast-fed or artificially-fed infants. However, this distinction is no longer so sharply defined because of the present practice of giving supplementary feedings to nearly all new-born babies. Although infants born to mothers of the poorer classes of the city have been attacked most heavily, yet babies of the better classes are also affected, depending upon the operating interrelationships of the ward and private maternity services of the various individual hospitals.

Once the infection gains foothold in a nursery, the apparent mode of spread is from baby to baby lying in adjacent bassinets. Not infrequently a pre-existing nursery infection such as thrush or impetigo appears to set the stage for the outbreak. The first cases of the disorder occur sporadically. A short interval-free or latent period may then intervene, to be followed by a rapid succession of cases in close sequence. At times intervals of several days may elapse between new crops of cases. The earliest instances of the disorder have occurred on the second day of postnatal life, other babies have been attacked as late as the 31st day, depending on the time of exposure to the disease.

During the investigations of the outbreaks, attention was directed toward tracing the path of transmission. Careful inspection was made of all possible common points of contact, such as may arise in the labor and delivery rooms, in the nursery and in the formula kitchen. In addition, a close check was made of the adult personnel on the obstetrical services, as well as of the nursery and diet kitchen staffs, and of the mothers in the maternity wards. However, despite extensive bacteriological studies of food, water, and equipment, and of nasal and pharyngeal secretions and stool specimens, the etiology of the disease and its point of origin were not revealed, nor could the inciting agent be isolated from the respiratory or gastrointestinal tracts of infected babies. Autopsy studies and tissue virus cultures likewise failed to reveal the etiological factor.

The prevalence of this epidemic form of diarrhea with its associated high mortality rates constitutes a situation requiring immediate attention. Moreover, in its broader aspects it is inextricably bound up with the general lowering of morbidity and mortality among the newly-born. As the initial epidemics were followed, we recognized early the necessity for a complete revision of present methods for the care of the new-born in hospital nurseries. We feel that the usual methods of obstetrical and pediatric practice and of preventive medicine have failed to cope efficiently with the situation. Epidemiologically, it would seem that very definite fundamental changes in the manner of conducting maternity and new-born services would prevent the

* These cities are Seattle, Wash.; Chicago, Ill.; Toronto, Can.; Memphis, Tenn.; New York, Rochester, and Buffalo, N. Y.; Teaneck, N. J.; Cincinnati and Cleveland, O.; Edinburgh, Scotland, and Garches, France.

occurrence not only of the disorder which we have described, but of infectious diseases in general among neonatal infants. Technics can be evolved which would break the chain of transmission of disease peculiar to the newborn.

Such measures we have discussed in a recent report.[3] They comprise immediate closure of infected nurseries and suspension of maternity services. We have also advanced suggestions for the prevention of the disorder as well as of infectious diseases in general in the neonatal group. It is not within the scope of this paper to review in detail these methods. It will suffice to state that they are based on the principles of surgical asepsis, and aseptic nursing and medical care. They are founded on efficient and workable methods which have long been adopted in contagious disease hospitals and in child-caring institutions. In advancing these proposals we fully realize that in their details modification may be necessary to meet local conditions. However, the basic principles involved are fundamentally sound. The measures were formulated to fit the construction and equipment of maternity services as they exist today. As far as the future is concerned, complete revision must be made in plans for housing maternity and new-born services in hospitals, greater stress being laid on the individual care of the mother and her newborn baby.

In conclusion, it should be added that as a result of recognition of the problem, a comprehensive program has been mapped out in New York City in an effort to reduce neonatal morbidity and mortality. The Sanitary Code has been amended listing as a reportable condition " Diarrhea in the New-Born up to 3 weeks of age occurring in a hospital giving maternity care." The terminology is designated broadly to include all types of diarrheal disturbances in order to determine early the existence of the epidemic form of the disease. We are also investigating all infant deaths under 1 year of age to determine by case history records and by post-mortem examinations the accuracy of diagnosis as listed on death certificates. This phase of the problem has been discussed in detail in the recent paper by Bundesen and his coworkers.[4]

SUMMARY

Attention is called to an unusual chain of outbreaks during the past 3 years of highly fatal diarrhea affecting new-born babies during their period of customary care in hospital nurseries. Extensive bacteriologic and pathologic studies have failed to shed light on the etiology of the disease. The epidemiologic features of the disorder are discussed and the fact is stressed that we are confronted with a situation requiring a closer scrutiny by public health authorities and by practising obstetricians and pediatricians of our present medical and nursing care of the newborn baby.

Although a satisfactory reduction has been evidenced in death rates from all causes among infants from 1 month to 1 year of age, an analysis of the vital statistics records of New York City indicates that we have accomplished exceedingly little in effecting a suitable lowering in the death rates among infants in the neonatal period. In fact, as far as diarrheal deaths are concerned, our data show a steady ascent in mortality among new-born babies during recent years. We attribute this increased mortality to the previously unrecognized clinical entity " Epidemic Diarrhea of the New-Born."

REFERENCES

1. Rice, J. L., Best, W. H., Frant, S., and Abramson, H. Epidemic Diarrhea of the New-Born: I. Preliminary Considerations on Outbreaks of Highly

Fatal Diarrhea of Undetermined Etiology Among New-Born Babies in Hospital Nurseries. *J.A.M.A.*, 109:475–481 (Aug. 14), 1937.

2. Rice, J. L., Barnard, M., Duffield, T. J., and Blumenthal, J. L. Infant Mortality in New York City. *A.J.P.H.*, 27:701–706 (July), 1937.

3. Frant, S., and Abramson, H. Epidemic Diarrhea of the New-Born: II. Control and Prevention of Outbreaks in Hospital Nurseries. *J. Pediat.* To be published.

4. Bundesen, H. N., Fishbein, W. I., Dahms, O. A., and Potter, E. L. Factors Responsible for Failure to Reduce Infant Mortality. *J.A.M.A.*, 109: 337–343 (July 31), 1937.

The Taxpayer and Public Health

. . . Taxpayers will not grudge the small part of their tax dollar which goes for public health if they are told in concrete terms what public health means to them.

Health administrators should travel incognito in buses and in other public places, tempting strangers to discuss the commonplaces of their administrative machinery. They will be surprised to find how few have any conception of the functions of the public health nurse or of a sanitary engineer. On the other hand, they will find to be remarkably prevalent superstitions about public health which ought long ago to have become extinct. They will find citizens complaining because the neighbor's house was not fumigated after a case of poliomyelitis had occurred in it. They will find a small, hard-headed but important group who, when it has learned what the health officer does, will be more than ever dissatisfied; who quite sincerely believe that his efforts are more sentimental than beneficial: "All this rescuing of the unfit is dysgenic and eventually will ruin the race." And always there will be the uncompromising liberals who resent every encroachment on individual liberty. A reasoned defense of the intention of public health in its fundamental aspects must be presented from time to time.—J. Rosslyn Earp, *Health News,* New York State Health Department, Albany, N. Y., Dec. 20, 1937.

Experiments on Antirabic Vaccination With Tissue Culture Virus*

LESLIE T. WEBSTER, M.D.

Rockefeller Institute for Medical Research, New York, N. Y.

AN outstanding problem in rabies today is the control of canine infection. In humans in the United States Registered Area, the disease is not increasing, for the number of cases has remained at 50 to 100 per annum for 14 years and, even in the states in which the disease in dogs is most prevalent, has not risen above 2 to 5 annually. In small, wild animals the disease is sometimes present and in livestock may assume epidemic proportions. But rabies, as recognized in this country, is chiefly an infection of dogs and is transmitted mainly through their bite.

To control canine rabies, two measures generally have been invoked—first, elimination of strays and confinement or appropriate muzzling of owned dogs to check the spread of the virus; second, vaccination of the dog population to increase its resistance. Restrictions have always been unpopular in this country despite their success in England; vaccination here is becoming widespread although its beneficial effects are in dispute. According to Umeno and Doi, one injection of phenolized vaccine was given to 215,000 dogs in the province of Tokyo with the result that 0.07 per cent subsequently developed rabies in contrast to 5.5 per cent among 30,000 unvaccinated dogs. Dennison reported similar favorable results in Alabama, but most observers find that the vaccine either does not protect the dogs (Schoening, Giese) or is virulent and induces rabies following vaccination (Giese, Michin, Schern, Hermann, etc.).

Krause, in his general review in the *Kolle, Kraus, Uhlenhuth Handbuch*, summarizes the problem well in stating that the question is extremely difficult to solve in the field and requires experimental evidence from the laboratory. This laboratory evidence, he thinks, is not yet at hand, inasmuch as the technic has involved the use of a test inoculation of virus which is either too small to yield comparable results in the unvaccinated controls or too massive to permit survival of the vaccinated group. Finally, workers on virus diseases in general raise two questions which bear on antirabic vaccination: (1) Is a non-virulent vaccine, especially when given in one dose, capable of immunizing dogs? (2) Is not the brain tissue vehicle which contains the virus responsible, in part, for post-vaccinal paralyses? The problem remains, therefore, to find an effective yet safe vaccine.

To develop such a vaccine, the following experiments have been carried out in our laboratory. First of all,

* Read before the Laboratory Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 6, 1937.

we chose as test animals mice of a selected Swiss strain, 100 times more susceptible to rabies than rabbits, guinea pigs, monkeys, and dogs in published tests. Next we discovered that the mice could be readily immunized against an intracerebral injection of test virus containing up to 10,000 lethal doses. A single intraperitoneal injection of at least 1,000 intracerebral lethal doses rendered mice resistant within 14 days and over a period of at least 9 months. Neutralizing antibodies were likewise present.

Having learned that these mice could be measurably immunized, we then examined various commercial preparations with respect to their immunizing capacities. None immunized the mice when given according to directions in a single dose in a quantity at least 10 times that administered to dogs per gram of body weight. If 6 or more doses were employed, however, a few vaccines immunized against 10 to 100 lethal doses, especially those found to contain virulent virus. One or two phenolized preparations containing no virulent virus showed mild immunizing potency following repeated injections. In all, we concluded that a single dose of present commercial canine vaccines does not render mice immune to the smallest measurable dose of test virus.

At this point, the possibility of a new source of vaccine was investigated. Preparations in current use are composed largely of virus-containing brain or cord tissue of rabbits, sheep, or monkeys. Nervous tissue is not only a superfluous but a potentially dangerous vehicle which may produce paralysis following vaccination, hypersensitiveness, or secondary infections. Until now, however, no other source of virus has been available and the nervous tissue has remained inseparable from the virus. In the fall of 1936, however, the propagation of rabies virus in culture media outside the animal body was reported by Kanazawa in Japan, and by Webster and Clow in New York. Our cultures have been continued unremittingly now for 95 passages and have become uniformly virulent through the 1/10,000 dilution. The technic of propagation is carried out in the following manner. Using aseptic technic throughout, 50 c.c. Erlenmeyer flasks are prepared with 4 c.c. of Tyrode solution containing 10 per cent normal monkey serum plus 0.02 c.c. of a suspension of minced mouse embryo brain. This flask culture medium is then inoculated with 1 c.c. of a 1 to 100 dilution of the brain of a mouse prostrate on the 7th or 8th day following an intracerebral injection of rabies virus. At 3 to 4 day intervals, the contents of the flask is withdrawn to a centrifuge tube, allowed to settle, and 2.5 c.c. of the relatively clear supernatant is transferred to a second culture flask. This passage technic is repeated routinely and the virulence of the culture virus is titrated by inoculating the material intracerebrally in tenfold dilutions in Swiss mice. As a source of vaccine the culture virus has the following advantages. It contains very little brain tissue, is practically water-clear, is of measurable, uniform virulence, keeps at least 60 days in bulk or in a frozen and dried state at icebox temperature.

This culture virus was tested for its ability to immunize mice. One-quarter c.c. of the undiluted culture, equal to 80,000 intracerebral lethal doses, was harmless when injected intraperitoneally and protected them in 14 days against a test intracerebral injection of 1,000 lethal doses of mouse brain virus. One-tenth of this amount of culture vaccine was likewise effective but 1/100, containing only 800 lethal doses, was insufficient for immunization. Immunity, when produced, endured at least 9

months and was accompanied by protective antibodies.

Attempts were then made with culture virus to immunize beagle puppies. At the outset it was necesary to establish the lethal dose for dogs of the virus to be used in testing the success of the vaccination. Mouse-brain virus, obtained originally from a skunk, was injected intracerebrally into the dogs in 1 c.c. amounts in dilutions ranging from 10^{-2} and 10^{-8} gm. In 5 tests in which the 10^{-4} dilution was given, all of 5 dogs succumbed; in 6 tests in which the 10^{-5} dilution was given, 9 of 11 dogs succumbed; in 6 tests in which the 10^{-6} dilution was given, 2 of 8 dogs succumbed. The minimum lethal dose of the virus for dogs in this intracerebral test was taken as the least amount giving 50 per cent or more mortality, namely, 1 c.c. of 10^{-5} dilution. Dogs were vaccinated with relatively small amounts of culture virus, 5,000 to 20,000 mouse lethal doses, barely 20 times that required to immunize mice. The vaccine has proved harmless to all 45 dogs thus far treated and has immunized them as follows. In the first test, 7 of 7 vaccinated dogs resisted 1 lethal dose of test skunk virus given 3 weeks later. In the second test, 4 of 4 vaccinated dogs resisted 1 lethal dose and 1 of 3, 10 lethal doses. In the third test, 3 of 3 vaccinated dogs resisted 1 lethal dose and 2 of 3, 10 lethal doses. In all, 14 vaccinated dogs all resisted 1 lethal dose fatal to 9 of the 11 controls. This difference is statistically significant. Likewise, 3 of 6 vaccinated dogs resisted 10 lethal doses fatal to all 5 tested controls. This difference, however, is not significant. The 15,000 mouse lethal doses of culture vaccine which immunized dogs against 1 test lethal brain dose can be contained in 1 c.c. and can be increased apparently without harm to 1,000,000 mouse lethal doses. With a larger amount of mouse lethal doses in the vaccine, a greater resistance is expected.

This evidence that dogs can be successfully immunized with a single injection of culture virus concludes our present report. Further experiments aimed at reducing still further the virulence of the culture vaccine without destroying its immunizing potency are now in progress and will be submitted in the near future.

Relation of Lymphocytic Choriomeningitis to Acute Aseptic Meningitis (Wallgren)*

R. D. BAIRD, M.D., AND THOMAS M. RIVERS, M.D., Sc.D.
Hospital of The Rockefeller Institute for Medical Research, New York, N. Y.

THE discovery of the virus of lymphocytic choriomeningitis was reported in 1934 by Armstrong and Lillie.[1] In 1935, Traub[2] described experiments showing that the virus is frequently demonstrable in normal-appearing mice. Also in 1935 Rivers and Scott[3] recovered the virus from the spinal fluid of 2 patients suffering with a disease fulfilling the criteria laid down by Wallgren[4] for the diagnosis of "acute aseptic meningitis" and definitely showed that the virus was the etiological agent responsible for their malady.

Wallgren[4] considered acute aseptic meningitis a clinical entity and laid down the following criteria for its diagnosis: Sudden onset of meningeal symptoms associated with a slight or moderate increase in the number of cells, especially lymphocytes, in a bacteria-free spinal fluid; a benign course with no complications; the absence of a focus of acute or chronic infection in the vicinity of the brain, for example sinusitis; and the absence from the community of diseases known to be capable of producing irritation of the meninges.

Inasmuch as the 2 proved cases described by Rivers and Scott[3, 5, 6] and the one proved case cited by Armstrong and Dickens[7] satisfied criteria for the diagnosis of acute aseptic meningitis it has been suggested by certain workers that all cases satisfying these criteria are caused by the virus of lymphocytic choriomeningitis. However, Rivers and Scott[6] have already presented some evidence that all cases of acute aseptic meningitis are not caused by this virus, and recently Armstrong and Wooley[8] obtained additional evidence which leads them "to feel that the clinical entity 'aseptic meningitis' is made up of more than one etiological entity." In spite of these reports there is still a tendency on the part of some investigators and clinicians[9] to assume or to imply that all cases of acute aseptic meningitis are caused by the virus of lymphocytic choriomeningitis. In view of this, we have examined the spinal fluid and blood from a number of cases of aseptic meningitis in order to determine how frequently this new virus is responsible for disease of the central nervous system in man. Furthermore, we have examined the his-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 6, 1937.

tories of these cases and the ones reported in the literature to see if it is possible to differentiate clinically the ones caused by the virus from those that are not.

For therapeutic purposes, Lepine and his coworkers [10] have infected human beings with a murine strain of lymphocytic choriomeningitis virus; about half of the inoculated patients developed meningeal involvement while the others exhibited fever and influenza-like symptoms. Furthermore, it has been shown [8] that many individuals without histories of having had any involvement of the central nervous system possess neutralizing antibodies against the virus of lymphocytic choriomeningitis. Consequently, it appears that an individual can be and not infrequently is infected with this virus without the central nervous system being obviously involved. Since we have been chiefly interested in the relation of the virus to acute aseptic meningitis we have not directly concerned ourselves with the non-meningeal form of disease caused by it.

MATERIALS AND METHODS

Spinal Fluid and Blood—Specimens of spinal fluid and blood from 65 cases of suspected acute aseptic meningitis were sent to us by physicians in different parts of the United States and Canada. We were unable to see the cases or to direct the manner in which they were handled; consequently, the histories and physical examinations were not so complete as they might have been, and many specimens essential for a laboratory diagnosis of lymphocytic choriomeningitis were not obtained. A number of the specimens came quite a distance by mail and this may account for our inability to recover the virus from certain cases.

Later we discovered that 31 of the 65 cases did not fulfil the requirements for a diagnosis of acute aseptic meningitis; among the 31 cases, diseases such as tuberculous meningitis and post-infection encephalitis were represented. The results obtained with material from this group served as excellent negative controls, but otherwise were of no significance.

Animals—Mice and guinea pigs from stocks known to be free from the virus of lymphocytic choriomeningitis were used in all experiments and tests.

Isolation of Virus—Details of the technic of isolating the virus of lymphocytic choriomeningitis from materials obtained from human beings and the method of identifying it have been described by Rivers and Scott.[5, 6]

Neutralization Tests—The neutralization test employed in this work is different from the one used by Scott and Rivers [5] and Wooley, Armstrong, and Onstott [11]; it was devised by Muench and Scott and a detailed description of it with the statistical data supporting it will appear later. All neutralization tests in this laboratory have been done with the W.E. strain of virus. From an examination of the results obtained with known positive sera and with known negative sera it became obvious to Muench and Scott that a 10^{-2} dilution of the virus was the critical one in the tests regardless of variations in the titer of the virus emulsion used. Such a statement applies only to this particular strain of virus which has been passed in guinea pig brains since isolation. In order to use another strain of virus in the manner to be described, its critical dilution would have to be determined by statistical methods.

The brain of a guinea pig inoculated with the W.E. strain of virus is removed aseptically at the height of the disease; by weight a 10 per cent emulsion in Locke's solution is made and called virus stock emulsion. A 10^{-2} dilution

is made of the stock emulsion and 1 c.c. of it is mixed with 1 c.c. of each serum to be tested. In all experiments a positive and a negative control are included. The mixtures of virus and serum are allowed to stand in an incubator at 37° C. for 1 hour, after which 0.5 c.c. of each mixture is injected subcutaneously into each of 4 guinea pigs; the animals are observed for 18 days. If 3 or 4 pigs survive, neutralizing antibodies are present; if 3 or 4 pigs die, neutralizing antibodies are considered to be absent; if 2 pigs die, the significance of the result is doubtful.

Results of tests made in the manner just described are much easier to interpret than are those of tests previously used. It is possible that a weakly positive serum may be missed occasionally. However, such an error is not to be deplored in this type of work.

RESULTS OF ATTEMPTS TO DEMONSTRATE VIRUS IN SPINAL FLUID AND BLOOD

Spinal fluid from 41 patients and blood from 11 of them, collected during the acute stage of disease, were examined for the presence of virus. Twenty-three of the specimens of spinal fluid and 9 of blood came from 23 cases that subsequently were found not to satisfy the criteria for a diagnosis of acute aseptic meningitis. Spinal fluids from only 2 of the patients whose convalescent blood showed neutralizing antibodies were examined, and they were collected late in the course of the disease. In none of the specimens of blood or spinal fluid was virus demonstrated.

Spinal fluid from 1 case of aseptic meningitis produced a mild febrile illness in guinea pigs, but this illness could not be produced in more than one or two successive lots of pigs. Furthermore, the pigs after recovery were not immune to the virus of lymphocytic choriomeningitis. If an infectious agent was responsible for this mild illness in the animals its source and identity were not determined.

RESULTS OF NEUTRALIZATION TESTS

Attempts were made to obtain serum from patients early in the course of disease and again 6 or 8 weeks after the onset of illness. In some instances we obtained both specimens; in others we secured a specimen only at the onset or after recovery. With these sera neutralization tests were promptly carried out in the manner described above.

Neutralization tests were performed on sera from 32 * cases satisfying the criteria for a diagnosis of acute aseptic meningitis. On a basis of the time of collection of the sera and the results of the neutralization tests the cases have been grouped in the following manner:

One proved case of lymphocytic choriomeningitis; serum did not neutralize at onset but did after recovery.

Seven presumptive cases of lymphocytic choriomeningitis; serum was not collected at onset of illness, but the specimen secured during convalescence contained neutralizing antibodies. Under such conditions it was impossible to be certain that the antibodies were not the result of a previous unrecognized infection with the virus.

Twenty-one cases of acute aseptic meningitis not caused by the virus of lymphocytic choriomeningitis; demonstrable neutralizing antibodies were not present in the sera collected from patients who had recovered.

Three equivocal cases; antibodies were not present in sera collected at onset of disease, but it has been impossible to obtain sera from the patients after they had recovered.

For the sake of convenience both proved and presumptive cases of lymphocytic choriomeningitis will be referred to as positive cases in the remainder of the paper, while cases of acute aseptic meningitis not caused by the virus of lymphocytic choriomenin-

* We had 34 cases satisfying the criteria for a diagnosis of acute aseptic meningitis, but from 2 of them we received only spinal fluid for examination.

TABLE I

*Summary of Signs and Symptoms Found in 23 Positive and 19 * Negative Cases*

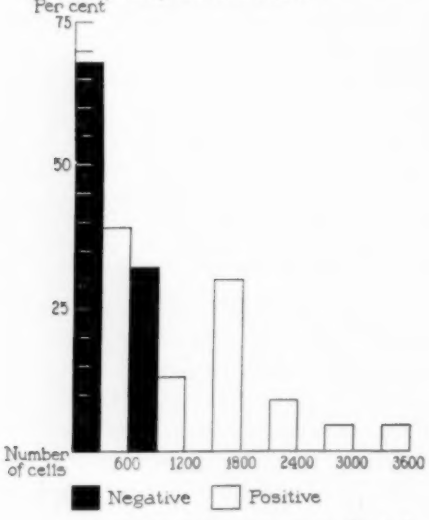
	23 Positive			19 Negative		
Signs and Symptoms	*Present*	*Absent*	*No Record*	*Present*	*Absent*	*No Record*
Influenza-like prodrome	16	7	..	3	15	1
Fever	20	2	1	17	2	..
Headache	20	2	1	15	2	2
Nausea and/or vomiting	18	5	..	14	4	1
Nuchal rigidity	18	1	4	17	2	..
Kernig's sign	12	5	6	12	3	4
Reflexes, hyperactive	4	14	5	5	12	2
Reflexes, hypoactive	6	12	5	5	12	2
Babinski's reflex	7	9	7	5	12	2
Localized neuropathy	5	18	..	5	14	..
Residual neuropathy	3	20	..	1	18	..

* Detailed records not available for 2 of the 21 negative cases.

gitis will be spoken of as negative. Thus, from the results of the neutralization tests, 29 of 34 cases of aseptic meningitis can be classified as positive or negative in regard to having been caused by the virus of lymphocytic choriomeningitis. Of the 29 cases, 8, or 28 per cent, were either caused or presumably caused by the virus in question, while, 21, or 72 per cent, were not. Of course one should keep in mind the possibility that an occasional patient infected with the virus may not develop antibodies.

Chart I

Percentage distribution of 19* negative and 23 positive cases on the basis of the maximum spinal fluid cell count.



* Records of the cell counts for 2 of the 21 negative cases were not available.

It is of interest to note that W.E., a proved case of lymphocytic choriomeningitis, still possessed neutralizing antibodies against the causative agent 2 years after recovery. On the other hand, W.S., a presumptive case 8 years of age, had, as shown by 2 tests, neutralizing antibodies 6 to 8 weeks after the onset of illness, but no demonstrable protective substances 8 months later.

ATTEMPTS TO DIFFERENTIATE CLINICALLY THE CASES OF ACUTE ASEPTIC MENINGITIS CAUSED BY THE VIRUS OF LYMPHOCYTIC CHORIOMENINGITIS FROM THOSE NOT SO INDUCED

In the literature 15 positive or presumptive cases of lymphocytic choriomeningitis [5, 7, 11, 12, 13,* 14, 15, 16, 17] have been described; these include 3 positive cases reported in a preliminary note by

* The tests on the cases reported by Dr. Dominick were done in our laboratory and the results are included in our tables.

TABLE II

Results of Clinical Examinations of 23 Positive Cases

Case	Age	Race and Sex	Month of Onset	Maximum Temp. Recorded	Maximum Cell Count, Spinal Fluid	Per cent Lympho-cytes, Spinal Fluid	Test for Syphilis: Blood	Test for Syphilis: Spinal Fluid
			Proved Lymphocytic Choriomeningitis					
S.B.	8 yrs.	W.M.	Sept.	104.0	1,400	80	..	—
W.E. (5)	31 "	W.M.	Dec.	104.0	1,700	Predominant	—	—
R.E.S. (5)	33 "	W.M.	Dec.	100.2	720	100	—	—
A.W. (12)	46 "	W.M.	Sept.	102.0	330	97	—	—
B.C. (12)	33 "	W.M.	Oct.	100.0	63	..	—	—
Case 4 (7)	20 "	W.F.	Mar.	100.8	409	100	—	—
Wallace S. (16)	33 "	W.M.	Feb.	103.8	304	100	..	—
F.A. (16, 17)	36 "	W.F.	Mar.	100.6	550	90	—	—
L.H. (16)	15 "	B.M.	May	99.6	1,800	98	—	..
			Presumptive Lymphocytic Choriomeningitis					
E.H.	8 mos.	W.F.	July	93.6	800	80	..	—
Barb. S.	29 yrs	W.F.	Aug.	100.1	720	100	..	..
William S.	8 "	W.M.	Sept.	101.0	280	100	—	..
M.T. (13)	19 "	W.F.	Oct.	101.0	1,380	100	—	—
C.P. (13)	14 "	W.F.	Oct.	104.0	300	100	—	—
Rose R.	15 "	W.F.	Mar.	100.0	540	100	..	—
And. W.	28 "	B.M.	June	101.0	1,400	95	..	—
Case 1 (7)	19 "	W.F.	May	102.0	3,200	96	..	—
Case 2 (7)	28 "	W.M.	Apr.	101.0	1,260	98	..	—
Case 3 (7)	33 "	W.M.	Oct.	102.0	1,255	100	—	..
W.C.'s pt. (12, 14)	5½"	W.F.	Nov.	99.4	2,155	98	..	..
Adam M. (15)	18 "	W.M.	Oct.	103.0	2,750	100	—	—
P.H. (11)	29 "	W.M.	Nov.	103.6	75	95	..	..
S.M. (11)	30 "	W.F.	Mar.	100.2	1,200	75	..	..

Rivers and Scott [16] which Scott will report in detail later. In addition to these 15 cases we have found 8 others during our recent experimental investigations. Thus, there are 23 cases of acute aseptic meningitis caused by the virus of lymphocytic choriomeningitis that are available for comparison with our 21 cases not induced by the virus in question. Therefore, it seemed of interest to determine whether there is a significant clinical difference between the two groups. The important clinical findings in the two groups are summarized in Tables I–III and in Chart I.

A comparison of the findings in the two groups reveals that a large number of the positive cases gave a history of an influenza-like prodrome, *i.e.*, general malaise, generalized pains, headache, upper respiratory infection, and fever, 1 to 3 weeks before the onset of meningitis, while from only a few of the negative cases was such a history obtained.

With the onset of meningitis the signs and symptoms in the positive and negative cases were similar and occurred with equal frequency in the two groups. Headache, nausea, vomiting, nuchal rigidity, abnormal deep reflexes, and fever were the usual findings.

A localized neuropathy was observed with approximately equal frequency in the two groups. Four negative cases (L.E., B.'s patient, J.R., and Ben S.) showed a transient facial paralysis, while another one (C.G.) developed a chronic arachnoiditis of the posterior fossa. One positive case (Adam M.) had a transient facial paralysis; an-

TABLE III

Results of Clinical Examinations of 19 Negative Cases*

Case	Age	Race and Sex	Month of Onset	Maximum Temp. Recorded	Maximum Cell Count, Spinal Fluid	Per cent Lympho-cytes, Spinal Fluid	Test for Syphilis	
							Blood	Spinal Fluid
Aili M.	32 yrs.	W.F.	Jan.	101.0	604	65	..	—
L.E.	30 "	W.M.	Jan.	102.0	110	100	—	—
R. LeP.	9 "	W.M.	Apr.	103.0	242	100	—	..
J.G.	15 "	W.F.	Dec.	105.0	20	90	..	..
C.G.	57 "	W.M.	Dec.	102.0	450	100	—	—
B.'s patient	32 "	W.M.	Feb.	100.0	607	100	..	—
Salv. M.	15 "	W.M.	Apr.	Slight fever	150	96	..	—
M.B.	16 "	W.F.	Apr.	104.0	940	98	—	—
J.R.	37 "	W.F.	Apr.	101.5	29	100	—	—
A.N.	42 "	W.M.	Sept.	103.0	32	100	—	—
D.H.	6 "	W.F.	Aug.	104.8	346	46	..	..
A.F.	3 "	W.M.	June	102.0	320	94	..	..
F.D.W.	10 "	W.F.	Apr.	102.0	340	60	..	—
Ben S.	30 "	W.M.	June	98.6	220	100	..	..
D.C.	7 "	B.F.	July	103.0	620	95	—	—
Richard R.	5 "	W.M.	July	101.6	80	90	—	—
F.A.L.	15 "	W.M.	July	101.0	1,000	Predominant	—	..
Simone M.	4½"	W.F.	Dec.	Slight fever	134	100	—	..
E.	Young	—M.	Dec.	104.0	672	100	..	..

* Detailed records not available for 2 of the 21 negative cases.

other (R.E.S.) showed transient unilateral sensory changes in the lumbar region; 3 others (A.W., B.C., and F.A.) developed bladder symptoms and muscular weakness and loss of sensation in the lower extremities. One (B.C.) of the last 3 patients mentioned also developed a facial paralysis which was still complete with electrical reaction of degeneration 7 weeks after the onset. The condition of A.W. was improved several months after the onset of the illness; the present condition of the patient has not been recorded. F.A.'s condition did not improve and when she was operated upon 6 months after the onset of her illness a chronic arachnoiditis involving the cord was found.

There were no significant differences in the amounts of protein, sugar, and chloride found in the spinal fluids of the two groups; nor were the hematological findings of aid in differentiating positive from negative cases. However, a comparison of the cell counts of the spinal fluids in the two groups shows that the positive cases tended to have more cells than did the negative. For example, 48 per cent of the positive cases at some time during the acute stage had more than 1,200 cells per c.mm., while this was true of none of the negative cases (Chart I).

There was no significant difference in the age of patients in the positive or negative groups. Furthermore, 10 of the 23 positive cases were in patients under 20 years of age, the 2 youngest being 5½ years and 8 months old respectively, a finding somewhat different from that reported by Armstrong and Wooley [8] and Wooley, Armstrong, and Onstott,[11] who, in view of their investigations, are inclined to believe that obvious infection with the virus of

lymphocytic choriomeningitis is relatively infrequent in infants and children.

COMMENTS AND SUMMARY

From the evidence presented in this paper it is obvious that all cases of acute aseptic meningitis (Wallgren) are not caused by the virus of lymphocytic choriomeningitis. The etiological agent or agents responsible for the cases not so induced are not known. Furthermore, from the records [12, 17] of 3 patients with lymphocytic choriomeningitis it appears that certain cases of the disease, because of the extent of paralysis and sequelae, do not satisfy the criteria laid down by Wallgren for the diagnosis of acute aseptic meningitis.

It is difficult or impossible to differentiate by clinical means alone the cases of acute aseptic meningitis caused by the virus of lymphocytic choriomeningitis from those not produced by the agent; however, the spinal fluid cell counts in the cases studied tend to be higher in the former group than in the latter.

Children and even infants are not infrequently attacked by the virus of lymphocytic choriomeningitis.

REFERENCES

1. Armstrong, C., and Lillie, R. D. Experimental Lymphocytic Choriomeningitis of Monkeys and Mice Produced by a Virus Encountered in Studies of the 1933 St. Louis Encephalitis Epidemic. *Pub. Health Rep.*, 49:1019 (Aug.), 1934.

2. Traub, E. A Filterable Virus Recovered from White Mice. *Science*, 81:298 (Mar.), 1935.

3. Rivers, T. M., and Scott, T. F. McN. Meningitis in Man Caused by a Filterable Virus. *Science*, 81:439 (May), 1935.

4. Wallgren, A. Une nouvelle maladie infectieuse du système nerveux central? *Acta Pediat.*, 4:158 (Apr.), 1925.

5. Scott, T. F. McN., and Rivers, T. M. Meningitis in Man Caused by a Filterable Virus. I. Two Cases and the Method of Obtaining a Virus from Their Spinal Fluids. *J. Exper. Med.*, 63:397 (Mar.), 1936.

6. Rivers, T. M., and Scott, T. F. McN. Meningitis in Man Caused by a Filterable Virus. II. Identification of the Etiological Agent. *J. Exper. Med.*, 63:415 (Mar.), 1936.

7. Armstrong, C., and Dickens, P. F. Benign Lymphocytic Choriomeningitis (Acute Aseptic Meningitis). *Pub. Health Rep.*, 50:831 (June), 1935.

8. Armstrong, C., and Wooley, J. G. Benign Lymphocytic Choriomeningitis. *J.A.M.A.*, 109:410 (Aug.), 1937.

9. Reimann, H. A. Infectious Diseases, Review of Current Literature. *Arch. Int. Med.*, 60:337 (Aug.), 1937.

10. Lepine, P., Mollaret, P., and Kreis, B. Réceptivité de l'homme au virus murin de la choriméningite lymphocytaire. Reproduction expérimentale de la méningite lymphocytaire bénigne. *Comptes. rend. Acad. d. Sc.*, 204:1846 (June), 1937.

11. Wooley, J. G., Armstrong, C., and Onstott, R. H. The Occurrence in the Sera of Man and Monkeys of Protective Antibodies Against the Virus of Lymphocytic Choriomeningitis as Determined by the Serum-Virus Protection Test in Mice. *Pub. Health Rep.*, 52:1105 (Aug.), 1937.

12. Findlay, G. M., Alcock, N. S., and Stern, R. O. The Virus Aetiology of One Form of Lymphocytic Meningitis. *Lancet*, 1:650 (Mar.), 1936.

13. Dominick, DeW. Lymphocytic Choriomeningitis. *J.A.M.A.*, 109:247 (July), 1937.

14. Collis, W. R. F. Acute Benign Lymphocytic Meningitis (Acute Aseptic Meningitis). *Brit. M. J.*, 2:1148 (Dec.), 1935.

15. Viets, H. R., and Warren, S. Acute Lymphocytic Meningitis. *J.A.M.A.*, 108:357 (Jan.), 1937.

16. Rivers, T. M., and Scott, T. F. McN. Five Cases of Lymphocytic Choriomeningitis in Man. *Trans. Am. Pediat. Soc.*, 48:41 (June), 1936.

17. Barker, L. F., and Ford, F. R. Chronic Arachnoiditis Obliterating the Spinal Subarachnoid Space. *J.A.M.A.*, 109:785 (Sept.), 1937.

Difficulties Encountered in Pneumococcal Type Determination*

ANNABEL W. WALTER

Bureau of Laboratories, Department of Health, New York, N. Y.

WITH the increasing availability of therapeutic serum for use in the treatment of pneumococcus pneumonia, rapid and reliable determination of the type of infecting organism is being demanded by more and more physicians. Sera for treating some of the types of pneumococci that occur less frequently will probably be produced in the near future, with the result that more laboratories will find it necessary to test not only for Types I, II, and III, but also for all other types for which therapeutic serum may be available. A number of methods of type determination have been presented.[1–18] Certain difficulties have arisen with each, and it is of some of these as we have experienced them that we propose to speak. No claim of originality is made for our methods; most of them were developed under the direction of the late Georgia Cooper whose devotion and application to the laboratory phases of the pneumonia problem resulted in many advances in type differentiation and serum production. My appreciation is also due Kathryn Blount and the other members of the present staff whose coöperation and interest have made it possible to accomplish a steadily increasing amount of work.

We have tried to group the difficulties according to their sources: in the specimen, the sera used for testing, the methods, and the equipment.

Specimen—Sputa, swabs from the throat, gastric contents,[19] cultures, pus, spinal fluids, pleural fluids may all be used for type determination.

Sputum should be fresh. The ideal age for the Neufeld reaction is less than an hour. If such rapid transportation from the patient to the laboratory is not feasible, the specimen should be kept in the icebox until it can be sent in, to delay as much as possible the overgrowth of organisms other than pneumococci. Some physicians have the impression that a fairly large amount of sputum is necessary, and will continue to collect the patient's expectorations over 12 to 24 hours. As small a volume as ¼ c.c. is usually enough for the Neufeld reaction, for a culture on a blood agar plate and, if necessary, for inoculation in a mouse.

The sputum should be collected in a clean, dry and preferably sterile container with no disinfectant. We prefer a clear glass wide-mouth bottle about 1¾" wide and 2½" high with a screw cap. The wide mouth is more convenient for the patient. Clear glass makes it easier to determine the consistency and color of the specimen and facilitates the removal of such more promising portions as bloody or mucoid flecks to a Petri dish for examination.

* Read before the Laboratory Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 8, 1937.

The bottle supplied in New York City for sputa to be examined for tubercle bacilli contains a liquid disinfectant which will dilute a thin watery specimen so much that the task of finding organisms when the Neufeld reaction is employed is almost impossible. Some disinfectants also have an inhibitory effect on the capsular swelling and, unless the specimen is very thick, will kill all the organisms so that attempts to cultivate them either by mouse inoculation or on artificial media are futile. The removal of sputum from the container to a Petri dish is easy if a 2 c.c. rubber bulb on a glass tube about 3" by 5/16" with a blunt point is used. In collecting sputum, care should be taken to make sure that the sample is actually pulmonary exudate raised by coughing, not retro-pharyngeal mucus or saliva.

In cases where sputum is not produced, as in infants and small children, suitable material for typing may be obtained by gently touching the pharynx with a sterile cotton swab on a long applicator to induce a cough and collecting on the swab any mucus produced.[10] The swab is then sent in a dry, sterile tube to the laboratory where it is twirled thoroughly in ½ c.c. of serum broth in order to remove the sputum, and then rolled against a dry part of the tube to squeeze out as much of the suspension as possible. If the pneumococci are too few for typing by the Neufeld reaction, they may be concentrated by centrifugation at a fairly high speed for 20 to 30 minutes and then resuspended in one or two drops of the supernatant fluid. We have obtained very good results with such material both by the Neufeld method and by mouse inoculation.

When blood cultures are made, it is essential the blood be added to suitable broth and mixed thoroughly to prevent clot formation as soon as it is drawn, and that the culture be either incubated immediately or stored at a temperature between 8 and 15° C. until it can be incubated. Broth cultures should be observed at intervals for growth, which may occur in from 12 hours to 3 days. When growth occurs, the type may be determined by the Neufeld reaction. Care should be taken that too much blood is not used; up to 2 c.c. for 50 c.c. of broth, or 1 c.c. for 25 c.c. of broth, is adequate. Much more prognostic value is attached to blood cultures made in poured agar plates from which the degree of bacteremia may be estimated and followed.

For growing pneumococci, it is essential that the medium used will support growth but will not cause rapid autolysis. We have found beef-heart broth and agar containing 0.2 per cent disodium phosphate as a buffer and with no sugar added very satisfactory. Directions for their preparation as carried out in this laboratory are given here in full because of the many requests we have had for details.

Soak chopped beef heart from which fat has been removed in tap water in the proportion 1 lb. to 1 liter overnight in the refrigerator. Boil until meat clumps and turns brown. Strain through cheese cloth. Test for carbohydrates. Good broth contains 1.2–1.5 mg. of total carbohydrate per c.c. Add 1.0 per cent Parke-Davis peptone and 0.2 per cent disodium phosphate. Dissolve by boiling with broth. Adjust reaction to pH 8.1 with sodium hydroxide. While the reaction is being adjusted, keep broth at boiling point to bring down precipitate. Final reaction should be pH 7.4–7.7. Filter through paper while hot. (Cotton is sometimes placed below paper to keep it from breaking.) Tube or bottle and sterilize in autoclave at 15 lb. pressure for ½ hour.

Test for support of growth by inoculating several tubes with 0.2 c.c. of the supernatant growth of blood broth cultures of several types of pneumococci (we use Types I, II, III, V, IX). Compare density of growth at 18 hours with known turbidity standards such as meningococcus standards. Determine pH of 18 hour growth. Broths whose pH fall below 6.8 as a result of digestion by the

organisms of the sugar in the media are unsatisfactory because pneumococci are injured by an excess of acid.

For media for maintenance of stock cultures, 3 per cent horse blood (citrated)* is added to the broth a few days before it is to be used.

The same stock may be used for agar medium.

Spinal fluids from pneumococcic meningitis should be examined as soon as possible. The organisms can be typed by the Neufeld reaction. If they are few, they may be concentrated by centrifugation or cultured in blood broth. Since only one type of pneumococcus is usually found in spinal fluids, a search for a possible mixed infection is not indicated.

Pus from ear infections or from peritonitis often contains many intracellular organisms. Dilution with broth may facilitate typing by the Neufeld reaction or cultures in blood broth may be made and typed when growth occurs.

Fluid aspirated by means of a syringe from the lung is usually too small in quantity for direct examination and requires cultivation in broth.[21]

Serum—For microscopic and macroscopic agglutination and precipitation tests, antisera produced in horses are employed. Each serum should be tested before use to determine its titer with the homologous strain and the degree of cross-reaction with all other types of pneumococci. Those sera which give a strong reaction with the homologous strain in a dilution which excludes cross-reactions (preferably 1–5 to 1–20) are most suitable. The dilution recommended should be indicated on the label of each vial. Sera produced in horses are not satisfactory for the Neufeld reaction.

For the capsular swelling reaction, antisera produced in rabbits are used. We have set an arbitrary agglutinin titer of 1–200 for our rabbit sera but the swelling titer may also be used as a criterion for adequate strength. Such sera should have a swelling titer of at least 1 to 15 to permit them to be combined in groups of at least 5 types and still have sufficient excess antibody present that reactions may be obtained with sputa containing many pneumococci or large amounts of soluble specific substance from autolysis. Each serum should be tested for cross-reactions with all other types of pneumococci. Sera which react nonspecifically should not be issued. We have found it more satisfactory to add methylene blue as the preparations are set up than to add to it to the rabbit serum in bulk.

Aging in the cold does not cause appreciable deterioration of either horse or rabbit serum. Although the specific titer drops slightly within the first year, nonspecific reactions become less the longer the serum is kept.

Method—In our hands, the Neufeld reaction has proved to be the most rapid and reliable method of pneumococcal type determination. The technic we use has been published previously but I quote it here.

Part of the sputum is placed in a Petri dish. The remainder is stored in the icebox until all tests are completed. "With a tiny loop or a straight wire place a very small amount of material on a cover glass, mix with 4 to 40 times the amount of serum as required and a standard loopful (0.01 c.c.) of Loeffler's methylene blue. Seal on a hollow-ground slide with cedar oil, place a drop of oil on the cover glass and examine with the oil immersion lens. Inverting the slides with the ends on side rests, and cover glasses down for a short time before examination seems to facilitate the examination, especially when the specimen is thin. The heavier elements, including the pneumococci, settle on the cover glass and may be more easily examined. A fairly good microscope is necessary and a powerful microscope light is a great aid. When only ordinary light is available the drops may be placed on flat slides and covered with cover glasses. When

* 1 per cent citrate (10 per cent citrate added—1 part in 10).

CHART I—Pneumococci with normal capsules. No reaction

CHART II—Pneumococci with capsules swollen. Positive reaction

the organisms are few they were somewhat more difficult to find in thin preparations." [17]

The procedure is to observe the reaction with 6 combinations of 4 to 6 antisera among Types I to XXXII [22] are divided. When we started using combinations 5 years ago, we made groups of as many as 12 sera,[17] but have since found that some sera may be too weak for consistent results in so great a dilution. If no reaction is observed immediately, we examine the preparations again after an hour or so.

The criticism we hear most often of the Neufeld method is "there are plenty of organisms but they do not react." Usually the failure to obtain a reaction may be traced to the relative amounts of sputum and serum used. Consistent results cannot be obtained by using equal parts of sputum and serum. It is unfortunately misleading that positive reactions do sometimes occur with such proportions. In order to be sure to have an excess of serum present, we use two separate loops of 28 gauge platinum wire—a very small one, 1 mm. in diameter, for placing the fleck of sputum on the coverglass, and a larger one, 4 mm. in diameter, for the serum and the methylene blue. A straight wire may be used for mucoid specimens loaded with organisms. From 4 to 10 times as much monovalent serum as sputum, and from 10 to 40 times as much combined serum as sputum seem to be satisfactory proportions for specimens containing moderate to large numbers of pneumococci. It is advisable to examine the first preparation made immediately to see if there are enough organisms present. With specimens containing very few, larger amounts of sputum will necessarily be required. The identity of organisms which resemble pneumococci in the hanging drop, but fail to react with any of the sera available, can only be determined by cultural examination.

It sometimes happens that a small amount of sputum collected in a paper container or one that is not air-tight will reach the laboratory nearly dried up. Broth may be added to resuspend such material. Another extreme is met more often: the specimen is extremely tenacious and very thick. When preparations made by mixing with serum are examined microscopically, large masses of material are seen in which organisms that do not react are noted. There is reason to believe the serum has not reached the organisms because of the nature of the sputum.

With such material, it is well worth while to try the technic proposed by Kohl [23]: a small amount of sputum is thoroughly mixed with about 5 c.c. of saline (0.85 per cent) or broth in a Petri dish. The flecks that float to the top are used for the Neufeld reaction. These preparations are very easy to examine because of the extreme clarity of the field.

When the specimen is thin some strains, especially Type III, show a marked tendency to be agglutinated by the specific serum. Large clumps of organisms are formed with the swollen capsules distinguishable only around the edge of the masses. As few organisms remain isolated in such preparations a thorough examination must be made lest they be overlooked entirely.

A small proportion of sputa will be found to contain two or more types of pneumococci. For this reason, it is not enough to find a positive reaction. One must be sure there is no reaction with any of the other diagnostic sera being used. If more than one type is found, some indication as to which is the causative agent may be obtained from the relative proportion of the different organisms present and from a knowledge of the incidence of the different types of pneumococci in healthy individuals. For example, types III, VIa & b, and XXIII are relatively more common in normal throats than are other types. Examination of a second specimen from the same case may reveal the presence of only one type.

If hanging drop preparations are made, the slides and cover-glasses must be thin. Slides less than 1.5 mm. in thickness and No. 1 cover-glasses allow enough working distance for focusing to the bottom of the drop. Cedar oil is supplied in different grades of viscosity. A medium weight is the best for year-round use.

There are disadvantages as well as advantages in the use of flat slide preparations for the Neufeld reaction. Among the advantages, is ease in setting up the preparations. Plain slides are uniformly thinner than hollow-ground ones, so adequate working distance is assured. A less powerful microscope lamp is required. Focusing is easier too, with only one plane to be examined. There are three chief disadvantages: first, it is a difficult and time consuming task to seal flat slide preparations so they may be reëxamined after an hour or so. As the drops dry around the edge, the organisms take on an appearance that may be mistaken for a swelling. The second disadvantage is that large drops of mixed sputum and serum are apt to seep out around the edges of the cover-glass and contaminate both the fingers of the operator and the lens. The third and most serious objection is that sputa that are very tenacious or that contain solid particles prevent the cover-glass from lying flat on the slide. When an attempt is made to focus on such a preparation, the cover-glass may move up and down with the lens in a very disturbing manner.

Specimens which fail to type by the Neufeld reaction may be examined further by the intraperitoneal inoculation of ¼ c.c. into a mouse which is observed at frequent intervals for signs of sickness. Symptoms may occur in 4 or 5 hours. At that time or in 18 or 24 hours, a puncture of the peritoneum is made. For this purpose, we use a capillary tube about 75 mm. long and 1 mm. in diameter drawn to a sharp point. The point is inserted into the peritoneum and a small amount of fluid is drawn out. The fluid will flow more readily if the mouse is held with the abdomen down. A small rubber bulb may be used to exert suction if necessary. The material obtained is examined by the Neufeld reaction, care

being taken that only minute amounts of exudate are used. Mice which show no organisms on puncture and continue in good health are killed at the end of 5 days. If the mouse dies or is sick enough to be killed, the peritoneum is opened and the exudate placed on the cover-glasses with a straight wire. Cultures are made in blood broth and on blood agar plates from the exudate and also from the heart's blood.

We have found the Neufeld reaction much more satisfactory than the stained slide agglutination technic or macroscopic agglutination and precipitation methods for examining peritoneal exudate, chiefly because of the absence in rabbit sera of the cross-reactions that occur to some degree in nearly all horse sera.

The extreme susceptibility of the mouse to pneumococci may lead to errors in typing. It succumbs so readily to most strains that if more than one type of organism is present, death from the more virulent type will usually occur so promptly that the presence of the other type will not be detected.

For example: a few Type III organisms from the throat of a patient whose sputum contains a moderate number of pneumococci of some other type will almost always cause death from Type III septicemia of a mouse inoculated with such material. If the mouse test only is used for typing, the other organism will be overlooked. An attempt to hold back a virulent type in a mouse if the presence of a less virulent type is suspected may be made by injecting an appropriate amount of serum for the virulent type along with the sputum.[24]

As a routine procedure, we culture each specimen received on a fresh blood agar plate in such a manner as to produce separate colonies.

A moderate amount of material on a platinum loop is streaked back and forth 10 or 15 times without lifting the loop from the surface. The loop is sterilized by heat and an equal number of streaks are made at right angles. This technic will almost always result in isolated colonies over the entire surface of the plate. The presence of hemolytic colonies may be detected more easily if a cut is made with a straight wire part way through the agar from the beginning of the streak diagonally across the plate.

The plate is incubated for 18 to 24 hours and the approximate percentages of the different types of colonies are recorded. Fishings to blood broth are made of green-producing colonies, at least one of each type observed, and are checked by the Neufeld reaction. If they do not react, bile-solubility tests are carried out to determine whether they are pneumococcus or streptococcus viridans. The technic we use is as follows:

Transplants are made from fresh blood-broth cultures to plain broth using 0.2 c.c. of the supernatant growth as an inoculum. After incubation for 18 to 24 hours, 0.2 c.c. of each culture is combined with 0.1 c.c. of ox-bile in a small tube (3 x 3/8"). Similar amounts of culture are combined also with 0.1 c.c. of broth as controls. Cultures which produce a granular or flocculent sediment are mixed well before use. As a guide to the clarity and color to be expected, one tube containing 0.2 c.c. broth and 0.1 c.c. bile is included. The tubes are incubated in a water bath at 45° C. for 1 hour and then examined. Those cultures which lyse completely in bile are considered soluble, and therefore pneumococci. The bile used must necessarily be crystal-clear. Centrifugation may be enough to clarify it but sometimes filtration is necessary. Each new lot of bile should be tested with known pneumococcus and streptococcus viridans cultures.

We also make a fairly thick smear of each sputum which we stain by Gram's method. This is not of much value in deciding whether or not pneumococci are in the specimen but the presence of numerous Gram-negative bacilli or Gram-positive cocci in bunches may be of interest to the physician.

From about 20 per cent of the 367 sputa we examined last winter (November 1, 1936—April 30, 1937), no indication as to the organism causing

the disease could be obtained by the methods described above.

Equipment—Adequate lighting for microscopic examination for the Neufeld reaction is most important. A fairly good microscope is necessary and an inclined binocular is certainly easier on the examiner. Sufficient light is absolutely essential. We use high power lamps equipped with 500 watt bulbs. There are, however, other lamps equipped with 100 or 200 watt bulbs on the market which should be satisfactory and less expensive to operate.

Hollow ground slides and coverglasses of proper thickness and two platinum loops of different sizes will speed up the examinations.

SUMMARY

Specimens for pneumococcal type determination should be fresh and should contain no disinfectant.

Labels on vials of diagnostic horse serum should indicate the dilutions best suited for macroscopic and microscopic agglutination as determined by tests with all types of pneumococci. Rabbit serum for the Neufeld reaction should be tested with all types and only specific serum should be issued.

The Neufeld reaction is the most rapid and reliable method for typing. The proper proportions of serum and sputum must be used for consistent results.

Mouse inoculation may be employed if no reaction is obtained on direct examination. Peritoneal exudate may best be typed by the Neufeld method, care being taken that very small amounts of material are used.

Cultural examination will show the relative proportions of different organisms present.

An adequate lighting system for the Neufeld reaction is essential.

REFERENCES

1. Neufeld, F. Ueber die Agglutination der Pneumokokken und Über die Theorieen der Agglutination. *Ztschr. f. Hyg.*, 40:54–72, 1902.

2. Blake, F. G. Methods for the Determination of Pneumococcus Types. *J. Exper. Med.*, 26:67–80, 1917.

3. Avery, O. T., Chickering, H. T., Cole, Rufus, and Dochez, A. R. *Acute Lobar Pneumonia.* Rockefeller Institute for Medical Research Monograph 7, Oct. 16, 1917.

4. Avery, O. T. Determination of Types of Pneumococcus in Lobar Pneumonia: A Rapid Cultural Method. *J.A.M.A.*, 70:17–19, 1918.

5. Krumwiede, Charles, and Valentine, E. Determination of the Type of Pneumococcus in the Sputum of Lobar Pneumonia. *J.A.M.A.*, 70:513–514, 1918.

6. Oliver, Wade W. A Rapid Method of Pneumococcus Typing. *J. Infect. Dis.*, 27:310–314, 1920.

7. Rosenthal, L., and Sternberg, B. A Rapid Method for Determining the Type of Pneumococcus in Sputum. *J. Lab. & Clin. Med.*, 15:78–81, 1929.

8. Sabin, A. B. The Microscopic Agglutination Test in Pneumonia. *J. Infect. Dis.*, 46:469–484, 1930.

9. Nuefeld, F., and Etinger-Tulczynska, G. Nasale Pneumokokkeninfektionen und Pneumokokkenkeimträber im Tierversuch. *Ztschr. f. Hyg. u. Infectionskrankh.*, 112:492–526, 1931.

10. Calder, R. M. A Microscopic Method of Typing Pneumococci by the Use of Stained Organisms. *J.A.M.A.*, 97:698–700, 1931.

11. Armstrong, R. R. Immediate Pneumococcal Typing. *Brit. M. J.*, 1:187–188, 1932.

12. Logan, W. R., and Smeall, J. T. A Direct Method of Typing Pneumococci. *Brit. M. J.*, 1:188–189, 1932.

13. Valentine, F. C. O. A Staining Method for the Direct Typing of Pneumococci. *Lancet*, 1:22 (Jan.), 1933.

14. Etinger-Tulczynska, R. Bakterienkapseln und "Quellungsreaktion." *Ztschr. f. Hyg. und Infectionskrankh.*, 114: 769–789, 1933.

15. Sabin, A. B. Immediate Pneumococcus Typing Directly from Sputum by the Neufeld Reaction. *J.A.M.A.*, 100:1584–1586 (May 20), 1933.

16. Beckler, E., and MacLeod, P. The Neufeld Method of Pneumococcus Type Determination as Carried Out in a Public Health Laboratory: A Study of 760 Typings. *J. Clin. Investigation*, 13: 901–907, 1934.

17. Cooper, G., and Walter, A. Application of the Neufeld Reaction to the Identification of Types of Pneumococci with the Use of Antisera for Thirty-Two Types. *A.J.P.H.*, 25:469–474, 1935.

18. Klein, S. J., and Heller, G. New Rapid Method for Direct Typing of Pneumococcus in Sputum of Pneumonia Cases. *Proc. Soc. Exper. Biol. & Med.*, 34:488–490 (May), 1936.

19. Wittes, S. A., and Bullowa, J. G. M. Gastric Aspiration in Children with Pneumonia to Obtain Material for Pneumococcus Typing. *Am. J. Dis. Child.*, 50:1404–1407, 1935.

20. Vinograd, J., Nemir, R. L., and Park, W. H. Rapid Typing by Neufeld Reaction Directly from Laryngeal Swabs from Infants and Children. *Am. J. Dis. Child.*, 51:792–800 (Apr.), 1936.

21. Bullowa, J. G. M. Reliability of Sputum Typing and Its Relation to Serum Therapy. *J.A.M.A.*, 105:1512–1518, 1935.

22. Cooper, G., Rosenstein, C., Walter, A., and Peizer, L. The Further Separation of Types Among the Pneumococci Hitherto Included in Group IV and the Development of Therapeutic Antisera for These Types. *J. Exper. Med.*, 55:531–554 (Apr.), 1932.

23. Kohl, C., and Reitzel, R. J. Type Specificity in Pneumonia and Pneumococcic Infections. *J.A.M.A.*, 106:1557–1561, 1936.

24. Griffith, F. The Significance of Pneumococcal Types. *J. Hyg.*, 27:113–159 (Jan.), 1928.

Alpha Hemolytic Streptococci of Air*

Their Variant Forms, Origin and Numbers per Cubic Foot of Air in Several Types of Locations

LEON BUCHBINDER, PH.D., MATHILDE SOLOWEY, AND MORRIS SOLOTOROVSKY

DeLamar Institute of Public Health, College of Physicians and Surgeons, Columbia University †; and W.P.A. Air Pollution Survey, Department of Health, New York, N. Y.

THIS is the second report on the study of bacteria in the air of several types of locations in New York City. The first, a brief preliminary note,[1] was read before this section in 1936.

The previous report summarized the findings as to average numbers of total bacteria and of alpha and beta streptococci, in 6 types of locations, during the first 16 weeks of the study. The present paper continues and elaborates the analysis of the findings, as to alpha streptococci, only, for an entire calendar year. The probable origin of the alpha streptococci found is also discussed, as well as the appearance, numerical frequency, and possible significance of certain variant forms.

THE NUMBER OF ALPHA STREPTOCOCCI IN THE AIR AT THE SEVERAL TYPES OF LOCATIONS

A total of 2,517 samples of air were examined by means of the Wells Air Centrifuge in sheep's blood agar cultures for the presence of alpha hemolytic streptococci. The samples were from sources distributed as follows: 6 schools, 46 per cent, the cars of a subway, 20 per cent, and 6 theatres, 6 streets, and a park, 34 per cent. The findings are presented in Table I.

Table I indicates that more streptococci were found in schools than in any other location, as evidenced both by the total number per cu. ft. and the percentage of positive samples. The subway was a close second in number of positive samples obtained, but the average number of streptococci for all samples in the subway was proportionately lower. Streets, non-air conditioned theatres, air-conditioned theatres, and the park followed in decreasing order as indicated.

The findings in the 6 schools are analyzed further in Table II according

---

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 6, 1937.

† Supported by a grant from the John B. Pierce Foundation.

NOTE: Most of the laboratory studies reported herein, were performed at the DeLamar Institute, while the routine collection of air samples was made by the Air Pollution Survey, a W.P.A. project sponsored by the Department of Health.

TABLE I

Alpha Hemolytic Streptococci per Cu. Ft. of Air at Several Types of Locations in New York City Studied for a Period of One Year

(Samples on Sheep's Blood Agar)

Location	*No. of Samples*	*No. Cu. Ft. of Air Sampled*	*No. of Strep. Isolated*	*Av. No. Strep. per Cu. Ft. Air All Samples*	*Per cent Samples Positive*	*Av. No. Strep. per Cu. Ft. Air Positive Samples Only*
All	2,517	36,080	4,015	0.08	48	0.16
Schools	1,164	17,232	2,511	0.15	68	0.22
Subway	491	6,761	657	0.10	62	0.15
Streets	310	4,468	443	0.10	54	0.18
Non-Air Conditioned Theatres	130	2,032	158	0.08	48	0.15
Air Conditioned Theatres	293	4,058	195	0.05	32	0.15
Central Park	129	1,529	51	0.03	25	0.14

to the individual school sampled. The first point of interest is that the schools fall into two distinct groups. Schools numbers 1 to 3 have higher average numbers of streptococci per cu. ft. of air for all samples and for positive samples, as well as a greater percentage of positive samples, than do schools 4 to 6.

Schools 1 and 2 are 2 of the oldest in the city and are in the lower east side. They are of definitely inferior construction, contain small rooms, and are difficult to keep clean, number 1 being the poorer of the 2. It may also be of interest that the children are of the lowest economic group in the city, and come from a health area which shows a high incidence of reportable communicable disease. Schools 5 and 6, the 2 high schools in the group, are located in the upper middle west side. While of more modern construction than the first 2 schools they cannot be called new. They are of more suitable design than the former, however, since they have large rooms, large windows, and high ceilings. These

TABLE II

Alpha Hemolytic Streptococci per Cu. Ft. of Air at Six Schools in New York City Studied for a Period of One Year

(Sampled on Sheep's Blood Agar)

All Types of Rooms

School No.	*No. Samples*	*Per cent Samples Positive*	*No. Cu. Ft. Air Sampled*	*No. Strept. Isol.*	*Av. No. Strept. Per Cu. Ft. Air*		*Av. No. per Positive Sample*
					All Samples	*Pos. Samples*	
All Schools *	194	68	2,872	418	0.15	0.22	3.2
1	180	82	2,128	554	0.26	0.32	3.7
2	194	77	2,893	567	0.19	0.21	3.8
3	186	74	3,000	480	0.16	0.22	3.5
4	209	57	3,208	343	0.11	0.19	2.9
5	199	58	3,049	285	0.09	0.16	2.5
6	196	60	2,954	282	0.09	0.16	2.4

* Averages

2 high schools can be rated as the best in the group in general appearance. School 6, moreover, is the only one of the 6 which uses a mechanical system of ventilation. Schools 3 and 4, in the upper east side, are of about the same age as the 2 high schools, but their type of construction is less modern. School 4 has better facilities for natural ventilation and appears to be somewhat cleaner than school 3. The pupils of school 4 are derived from a higher economic group than those of the other 5 schools.

Three types of enclosed spaces have been sampled in each school—classrooms; assembly rooms such as playrooms, lunch rooms and gymnasia; and corridors. The classrooms were tested while they were occupied, within 1 hour after they had been vacated ("Just Vacated") and after longer periods of vacancy ("Vacant"). The assembly rooms were studied both occupied and vacant. The findings are listed in Table III. The values for the average number of streptococci per positive sample for all schools indicate that occupied assembly rooms had most alpha streptococci, followed by occupied classrooms, corridors, just vacated classrooms, vacant assembly rooms, and vacant classrooms in the order named. The sequence of percentage of positive samples is practically identical. When the findings for each school are examined separately the differences between the two groups of schools noted above (1 to 3 and 4 to 6) hold almost constant throughout the 6 conditions.

THE ORIGIN OF ALPHA STREPTOCOCCI OF AIR

In an attempt to determine the origin of air streptococci more than 2,000 strains of alpha streptococci have been studied in detail. All cultures were classified into the 8 species of the Holman system and in addition were examined for their microscopic morphology and their effect on litmus milk.

The results indicate that the probable origin of most of the air streptococci is the human throat.

Results—The distribution in the Holman system of cultures from the

TABLE III

Alpha Hemolytic Streptococci per Cu. Ft. of Air in Several Types of Rooms at Six Schools in New York City Studied for a Period of One Year

(Sampled on Sheep's Blood Agar)

	Occupied Classrooms			*Just Vacated Classrooms*			*Vacant Classrooms*			*Corridors*			*Occupied Assembly Rooms*			*Vacant Assembly Rooms*		
School No.	*No. Samples*	*% Samples Positive*	*Av. No. Strept. per Positive Sample*	*No. Samples*	*% Samples Positive*	*Av. No. Strept. per Positive Sample*	*No. Samples*	*% Samples Positive*	*Av. No. Strept. per Positive Sample*	*No. Samples*	*% Samples Positive*	*Av. No. Strept. per Positive Sample*	*No. Samples*	*% Samples Positive*	*Av. No. Strept. per Positive Sample*	*No. Samples*	*% Samples Positive*	*Av. No. Strept. per Positive Sample*
All Schools *	87	71	3.3	48	66	3.2	19	53	2.1	12	74	3.3	16	75	3.7	13	59	2.9
1	73	78	3.5	37	78	3.8	11	64	2.6	21	86	3.8	26	100	4.6	12	92	3.7
2	81	83	4.1	50	74	3.3	10	30	1.0	13	93	3.4	24	83	3.8	16	69	4.4
3	98	83	3.5	56	70	3.8	8	63	2.0	8	75	4.5	3	67	3.0	13	39	1.4
4	95	66	3.0	50	50	3.0	16	31	2.8	10	60	1.8	24	54	2.8	14	64	2.2
5	92	61	2.8	50	68	2.3	30	47	1.8	10	63	2.7	4	75	1.7	13	39	1.8
6	86	58	2.5	43	60	2.8	37	68	2.0	8	74	2.4	14	50	2.4	8	50	1.2

* Averages

TABLE IV

The Origin of 1,949 Cultures of Alpha Streptococci Isolated from the Air at Several Types of Locations and Identified by the Holman System of Classification

	Str. Salivarius		*Str. Mitis*		*Str. Ignavus*		*Str. Salivarius* *		*Str. Equinus*		*Str. Fecalis*		*Str. Non-Hemolyticus I, II, III*		
Location	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*Totals*
All	1,136	58.4	317	16.3	167	8.6	1,620	83.2	189	9.7	87	4.4	53	2.7	1,949
Schools	828	64.4	200	15.5	85	6.6	1,113	86.5	93	7.2	45	3.5	35	1.9	1,286
Subway	142	55.7	50	19.6	23	9.0	215	84.3	22	8.6	17	6.7	1	0.4	255
Theatres	90	59.6	24	15.9	18	11.9	132	87.4	11	7.3	5	3.3	3	2.1	151
Streets	66	28.4	40	17.2	33	14.2	139	59.7	60	25.7	20	8.6	14	6.5	233
Park	10	41.7	3	12.5	8	33.3	21	87.5	3	12.5	0	0.0	0	0.0	24

* *Str. salivarius* of Safford, Sherman, and Hodge [2]

several types of locations is given by both total numbers and percentages in Table IV. It is noted that 83.2 per cent of cultures from all locations fall into the 3 species—salivarius, mitis and ignavus—whose presumable origin is the human nasopharynx. Likewise 9.7 per cent are equinus and 4.4 per cent fecalis, while the remaining 2.7 per cent are classified by their sugar fermentations in the 3 so-called non-hemolytic species although they all produce greening on agar. When the figures are further analyzed by the 5 types of locations sampled, it is seen that the percentage of throat strains at each type of location except streets varies between 84.3 and 87.5. The high figure for the park is probably not significant, since only 24 cultures were included. The percentage of 59.7 for street cultures, although less than that for the other types of locations, as was to be expected, is still relatively high, in fact greater than the combined figures for equinus and fecalis (34.3 per cent). Nevertheless, if the lower percentage of streptococci of presumably nasopharyngeal origin obtained from streets is applied to the data on total counts in Table I, streets drop from 2nd or 3rd to 5th place in order of relative importance, the park alone being lower.

As was to be expected the percentage of equinus cultures in streets was higher (25.7) than that at any other location. The next greatest was park (9.7) and the lowest schools and theatres (7.3).

A check on the identification of strains is provided by their reaction on litmus milk as given in Table V. Only 11.5 per cent of the salivarius cultures

TABLE V

The Effect of Air Streptococci of Throat and Fecal Origin on Litmus Milk

	Number of Cultures			*Percentage of Cultures*		
	Acid and Coagulation	*Acid*	*No. Acid*	*Acid and Coagulation*	*Acid*	*No. Acid*
Str. Salivarius	440	683	13	38.7	60.1	1.1
Str. Mitis	116	156	45	36.6	49.2	14.2
Str. Ignavus	3	35	129	1.8	21.0	77.2
Str. Salivarius *	559	874	187	34.5	53.9	11.5
Str. Equinus	0	8	181	0.0	4.3	95.7
Str. Fecalis	29	57	1	33.3	65.5	1.2

* Salivarius of Safford, Sherman and Hodge [2]

(Safford, Sherman and Hodge [2]) failed to produce acid; 77 per cent of these were cultures (ignavus) which do not ferment lactose. It should be pointed out that a greater number of air cultures of presumed nasopharyngeal origin failed to coagulate milk than would be expected with strains obtained directly from human sources. That only 4.3 per cent of equinus cultures affected milk is in conformity with the report of Hodge and Sherman [3] who observed that none of 72 recently isolated equinus strains studied had any effect on milk. Likewise the finding that 98.8 per cent of the fecalis strains fermented milk agrees well with a similar observation of Sherman, Mauer, and Stark [4] on 434 cultures.

THE VARIANT FORMS OF ALPHA STREPTOCOCCI IN AIR

When the air sampling studies were begun there were observed in the Wells cylinders a number of suspicious pinpoint colonies which produced alpha hemolysis on blood plates but did not appear to be typical streptococci when examined microscopically after 18 hour broth culture.

Although they were Gram-positive cocci which varied in size in different cultures from small to large, as do air streptococci, they differed from the latter by appearing either as diplococcal forms, tetrads, or irregular groups of cocci, large or small. Usually one type of grouping predominated but seldom if ever was it the only one present. In addition occasional short chains comprising no more than 6 cocci were noted, but they were never predominant. Analysis of the microscopic morphology of 1,949 air strains reveals that only 39.6 per cent (771) formed typical moderate to long chains while the remaining 60.4 per cent (1,178 strains) formed predominantly pairs, tetrads, or groups of cocci.

In an attempt to arrive at an objective decision as to the identity of these aberrant strains, regarded provisionally as streptococci, two series of studies were undertaken: (1) a comparison of the biochemical and morphological properties of (a) definite alpha streptococci freshly isolated from human throats, (b) definite, and (c) putative alpha streptococci of air; (2) a comparison of the distribution of the several variant morphological types at the different locations and of the incidence of definite and putative strains of presumed nasopharyngeal origin in the several Holman species.

It was found that the aberrant organisms were probably altered streptococci.

TECHNIC

ORIGIN OF CULTURES

The alpha streptococci of the throat were isolated from sheep's blood agar plates which had been streaked with routine throat swabs. They were obtained from the diagnostic laboratory of the Department of Bacteriology, College of Physicians and Surgeons. Both the definite and putative alpha air streptococci were isolated from Wells' sheeps' blood agar cylinders which had been exposed in the usual places of sampling.

TESTS

The following properties were studied:

1. *Fermentation*—Brom-creosol purple meat extract broth was used, prepared according to the following formula: 0.3 per cent Liebig's meat extract, 1 per cent neopeptone, 0.5 per cent sodium chloride, and 1 per cent of the test substance. Thirty c.c. of 0.04 per cent brom-creosol purple solution were added to each liter of medium. The tests were performed by inoculating 2 drops of 18 hour broth

TABLE VI

A Comparative Study of Some Morphological and Biochemical Properties of Alpha Streptococci of the Throat and of Air, and a Group of So-called Putative Alpha Streptococci of Air

Cultures / Origin		No.	Holman Species: Salivarius Lactose+ Salicin— Mannite—	Mitis Lactose+ Salicin+ Mannite—	Ignavus Lactose+ Salicin— Mannite—	Fermentation of Dextrose, Sucrose, Maltose, Levulose and Galactose: Positive	Negative	Fermentation of Raffinose: Pos.	Neg.
Throat		69	50	10	9	48	21	36	33
Air	Definite	56	24	14	18	37	19	22	34
	Putative	99	58	23	18	86	13	16	83
Per cent			72.5	14.5	13.0	69.6	30.4	52.2	47.8
			42.9	25.0	32.1	66.1	33.9	39.3	60.7
			58.6	23.2	18.1	86.9	13.1	16.2	83.8

Cultures / Origin		Final pH in Dextrose Broth: Between 4.2 and 4.7	Between 4.8 and 5.5	Between 5.5 and 6.4	Effect on Litmus Milk: Acid and Coagulation	Acid	No Reaction	Growth on Blood Agar: Type of Hemolysis: Clear Green Discrete	Clear Green Diffuse	Green Clear Green	Moderate Green	Colony Morphology: Translucent	Opaque	Opaque White Center	Appearance of Broth: Clear	Cloudy
Throat		45	17	0	48	16	5	50	2	4	3	56	3	0	34	35
Air	Definite	30	17	6	35	11	10	40	5	5	4	46	6	2	22	34
	Putative	5	68	23	5	65	29	57	23	9	9	18	55	25	8	91
Per cent		72.6	27.4	0.0	69.6	23.2	7.2	84.8	3.3	6.8	5.1	94.9	5.1	0.0	49.3	50.7
		56.6	32.1	11.3	62.5	19.6	17.9	74.1	9.1	9.1	7.7	85.2	11.1	3.7	39.3	60.7
		5.2	70.8	23.9	5.1	65.6	29.3	58.2	23.5	9.2	9.2	18.4	56.1	25.5	8.1	91.9

culture into 2 c.c. of the medium which had been Arnoldized on 3 successive days. Results were recorded at the end of 48 hours and 96 hours incubation at 37° C. Action on the following substances was studied: lactose, salicin, mannite, dextrose, sucrose, levulose, maltose, inulin, galactose, raffinose, arabinose, glycerine, and sorbitol.

2. *Final pH in dextrose broth cultures*—Cultures prepared as stated above were incubated for 7 days at 37° C. and then tested electrometrically by means of the glass electrode.* The pH value was calculated to the second decimal place by reference with standard buffers of known pH, and recorded to the first decimal place.

3. *Effect on litmus milk*—Litmus milk was prepared by adding approximately 60 c.c. of litmus solution to 1 liter of defatted fresh pasteurized milk, and tubed in 2 c.c. amounts. Inoculations and readings were carried out in a manner similar to that for fermentation tests.

4. *Macroscopic and microscopic morphology and effect on blood*—All cultures were examined microscopically after 18 hour incubation in nutrient beef infusion broth (pH 7.6 to 7.8) and the relative clarity or cloudiness of the broth was recorded as well. In

* We are indebted to Dr. Theodor Rosebury of the Department of Bacteriology for the use of his glass electrode-vacuum tube potentiometer.

addition pour plates of 4 per cent sheep's blood agar were prepared with each culture. Type of hemolysis was recorded after 18 hours incubation at 37° C. and after 2 additional days at room temperature as well as the translucency of the colonies and the approximate ratio of surface to sub-surface colonies.

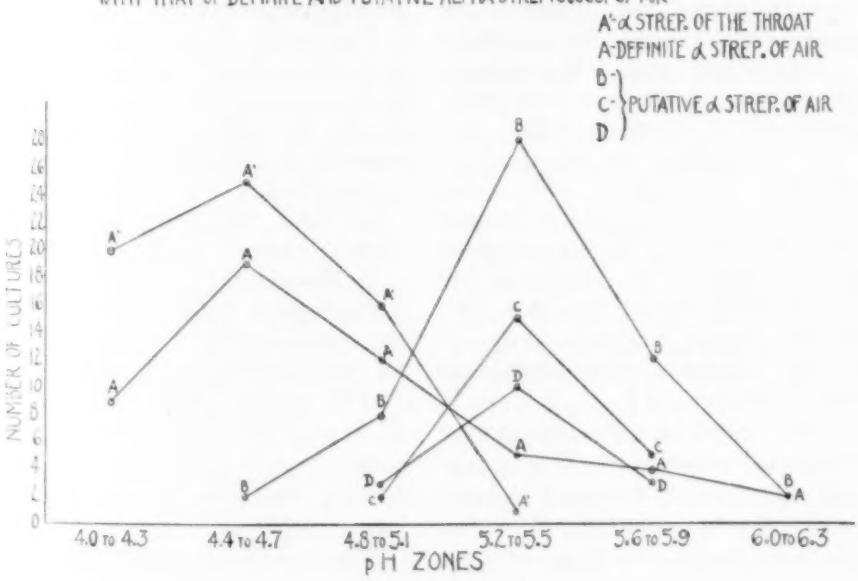
RESULTS

1. The fermentative action of 69 throat cultures on 3 sugars, lactose, salicin and mannite, which determine 8 species of alpha streptococci in the Holman classification, indicated that all cultures fell into one of 3 species—salivarius, mitis, or ignavus. Accordingly, only those actual and putative air alpha streptococci which gave similar reactions with the same substances and which composed a majority of the strains were included in the comparative study. It is seen from Table VI that the largest number of strains in each group gave the reactions of *Str. salivarius*. Further discussion of the distribution of cultures in the 3 species of Holman is of doubtful value since Safford, Sherman, and Hodge[2] have recently concluded that they are in reality but a single species. Over 60 per cent of the cultures in each group fermented all of the 5 sugars: dextrose, sucrose, maltose, levulose, and galactose, with the putative forms having the highest percentage (86.9). On the other hand, the putative forms acted on raffinose only seldom (16 per cent); whereas 50 per cent of throat and 40 per cent of definite air forms fermented raffinose. Fermentation of the other substances studied (not included in the table) was rare; inulin was fermented by only 10 throat strains, 5 definite and 2 putative air strains; sorbitol by 1 strain each of the 3 groups; arabinose by 5 definite air strains only and glycerin by none.

Examination of the final pH values

FIGURE 1

COMPARISON OF THE pH OF CULTURES OF ALPHA STREPTOCOCCI OF THE THROAT WITH THAT OF DEFINITE AND PUTATIVE ALPHA STREPTOCOCCI OF AIR



in glucose broth cultures reveals a distinct difference between the putative air strains on the one hand and the definite air and throat strains on the other. The greatest number of the putative air strains yielded values in the pH zone 4.8 to 5.5, while most of the definite air and throat strains yielded pH values between 4.2 and 4.7. The data on pH have been further analyzed in Figure I, where the number of cultures is plotted as ordinates and the pH zones as abscissa. The putative air streptococci for this purpose have been separated into 3 groups on the basis of predominating microscopic morphology: in group B, diplococci; in group C, tetrads; and in group D, irregular groups or clumps. The graph indicates that most of the cultures of both throat and (definite) air streptococci fall into a zone of pH from 4.1 to 5.0 with a peak in both instances occurring at 4.4 to 4.7; whereas a great majority of each of the 3 putative air forms are distributed in a zone of pH between 4.8 and 5.9 with the peak in each instance occurring between 5.2 and 5.5.

Analysis of the effect of the several groups on litmus milk confirms the impression that the putative air strains are comparatively weak acid producers, since the majority of them form insufficient acid to coagulate milk. The obvious streptococci, on the contrary, both acidify and coagulate milk. These findings confirm an impression obtained when the routine sugar fermentations were performed: that the throat and long-chained air strains form more acid than the aberrant strains, as evidenced by color difference with brom-cresol purple indicator.

It was noted that all strains after 18 hours incubation at 37° C. in poured blood agar plates produced colonies surrounded by green zones. After further incubation for 48 hours at room temperature several distinct patterns appeared. One, most common for all 3 groups, consisted of a zone of clearing immediately adjacent to the colony and about equal in width to the diameter of the colony which usually contained some intact red cells. Surrounding this area, was a narrower discrete green halo. About a quarter of the putative strains and a few of the definite streptococci showed a diffuse rather than a discrete green zone. Two less common patterns were observed with strains of all groups: (a) adjacent to the colony a discrete green zone, then a clear zone, and finally a second green zone; and (b) a green zone without differentiation.

The surface colonies were usually smooth and were either translucent, opaque, or opaque with a white center. Most of the throat and definite air streptococci gave translucent colonies, whereas the colonies of putative strains were opaque, with or without a white center. The translucent colonies grew on the surface in smaller proportion than did the opaque ones. The inference might be made, therefore, that opaque colonies tolerate free oxygen better than translucent ones.

The study of the relative turbidity of broth cultures disclosed the well known tendency of long-chained streptococci to produce an almost clear supernatant broth. Ninety-two per cent of the putative air streptococci, on the other hand, which displayed no long-chained forms, yielded cloudy broth.

2. The distribution of the 3 variant morphological types was consistent in the several locations. Thus the figures for pairs, tetrads, and groups in schools (1,286 strains) were 25.1, 8.9, and 23.6 per cent, respectively, whereas those for all other locations (663 strains) were 26.5, 9.8, and 29.6 per cent.

The uniformity of distribution of the

TABLE VII

Comparative Distribution of Definite and Putative Streptococci of Air in the Throat Species of the Holman Classification

		Str. Salivarius		*Str. Mitis*		*Str. Ignavus*		*Total*	
		No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%**
All Locations	Definite	503	74.1	137	20.2	39	5.7	679	41.9
	Putative	633	67.3	180	19.1	128	13.6	941	58.1
Schools	Definite	385	76.4	99	19.6	20	4.0	504	45.3
	Putative	443	72.7	101	16.6	65	10.7	609	54.7
Subway	Definite	85	69.7	28	23.0	9	7.3	122	56.7
	Putative	57	61.3	22	23.7	14	15.0	93	43.3

* Per cent of definite and putative cultures combined.

several morphological types is depicted by a different method in Table VII. The percentage distribution of cultures in the 3 throat species at both schools and the subway indicate a good correlation between the incidence of definite and putative strains.

SUMMARY

Although most properties of definite air streptococci agree well with those of throat strains, several properties of the putative strains are at variance. The putative strains are similar to those of the throat in the fermentation of lactose, salicin, mannite, dextrose, sucrose, maltose, levulose, and galactose; the last 5 are fermented more frequently by the former than by the latter. Likewise putative strains yield the same general type of colonies and produce similar hemolysis on blood agar. There may be added as points of similarity the occasional suggestion of streptococcal morphology (a few very short chains) in some putative strains, and their consistent distribution in air similar to that of definite streptococci. Finally, attempts made in this laboratory to age putative strains in broth in order to dissociate chains of cocci from them have yielded suggestive results. Conversely, throat strains of streptococci aged in like manner have given some indications that they may produce cocci of altered grouping. It seems justifiable, therefore, to assume that the aberrant forms are closely related to the streptococci of the throat and possibly derived from them.

If this hypothesis be accepted, one cannot help but be impressed by the marked differences between the altered and the typical streptococci. The former, besides differing microscopically, produce far less acid, seem to ferment raffinose less frequently, form opaque colonies more frequently, and are better adapted to aerobic growth. Since our experience with throat strains suggests that such variant green streptococci are rarely if ever present in the nasopharynx, and since it is difficult to believe that their normal habitat is the air, it would appear that their aberrant characteristics developed as a result of their aerial environment.

DISCUSSION

Two principal questions asked at the inception of this study were: (1) Does the presence of alpha hemolytic streptococci in air indicate human pollution thereof? (2) Can quantitative estimation of their numbers serve as an index of the degree of pollution? The first question would seem to be answered affirmatively since the results in schools, a subway, and theatres indicate that a great majority of air alpha streptococci

are probably of human nasopharyngeal origin. Comparison of several properties of a number of strains of air streptococci with those of streptococci isolated from throats reveals a high degree of correlation.

It also seems most likely that the number of alpha streptococci present in air indicates the degree of human pollution. The latter in turn is probably influenced by the extent of current or recent occupancy and the quality of ventilation. Since the conditions obtaining during routine sampling at the several types of locations could not be readily controlled it is difficult to evaluate finally the relative importance of crowding and ventilation. However, it appears that other conditions being constant the effects of ventilation are more important than those of crowding. Thus subway cars, which are grossly overcrowded at certain hours but which have adequate ventilation, had less streptococci than schoolrooms which usually provide much more air space per person but are not so well ventilated. Similarly fewer positive samples and fewer streptococci per sample were also obtained from theatres where larger numbers of persons congregate in single rooms than in schools. Here the presence of more persons appears to be compensated for by the diluting effect of a large air space which in addition is supplemented by an almost constant influx of fresh air. Incidentally the smaller percentage of positive samples in air conditioned as compared to non-air conditioned theatres might also be regarded as an expression of better ventilation.

It is obvious that, in the absence of guiding precedents, it is difficult to set absolute standards of quality on the basis of the total number of alpha streptococci in air. It is not so difficult, however, to assess the fact that the schools studied had far more streptococci per available unit of space than any other type of location; or that certain schools, which had the highest index of streptococci, also were the oldest and the most difficult to keep clean, and were so constructed that there was a maximum of pupils in a minimum of space. These findings were in schools all of which were relatively old. Newer schools, with better ventilation, would probably show better conditions.

It is apparent that a majority of alpha streptococci of air have become altered in morphology and physiology. In experiments not recorded above it was found that a sweeping of unoccupied schoolrooms immediately before taking air samples resulted on the average in a twofold increase of the alpha streptococci of air. It seems clear, therefore, that the normal air flora of occupied rooms must include streptococci of both recent and remote human origin. These findings suggest that respiratory pathogens cast into air may likewise persist and become altered. Indeed it has been shown by White [5] that beta hemolytic streptococci can be obtained from the air of unoccupied hospital rooms by sweeping their floors as long as 2 weeks after the removal of patients suffering from puerperal fever. Likewise Brown and Allison [6] recently found that hemolytic streptococci can be isolated with relative ease from scarlet fever wards. These authors observed that the greatest numbers of organisms were found in the morning hours due to the various morning activities such as sweeping, cleaning, making of beds, etc. These persistent forms may be regarded as potential pathogens, but to what degree they may have been altered by their aerial environment is not known.

The nature and significance of such aerial changes, if they occur, with particular reference to possible epidemio-

logical effects, are questions for further study. Work is now in progress in which under controlled conditions of temperature, humidity, light, ionization, etc., it is hoped to ascertain not only the lethal but also the debilitating action of air on organisms artificially sown therein.

SUMMARY

Streptococci of the alpha hemolytic types were found to be widely distributed in the air both of enclosed places of congregation and of the open spaces of a large city. A large majority of these organisms seemed to be of nasopharyngeal origin. Many of the strains, of presumed nasopharyngeal origin, differed in morphology and certain biochemical properties from typical alpha streptococci of the throat. It is suggested that these differences are due to the effects of aerial environment. The possibility of similar alterations in respiratory pathogens is discussed.

Alpha hemolytic streptococci were present most frequently and in greatest numbers in the air of school buildings, and an apparent relationship was noted between the type of room and degree of occupancy and the numbers found, the largest numbers being found in occupied assembly and classrooms. The quantitative distribution of streptococci in the other types of locations may be listed in a descending order as follows: Subway, non-air conditioned theatres, air-conditioned theatres, streets and park.

An attempt is made to associate the differences in streptococcal content of the several types of enclosed places, as well as in the individual schools, with their varied facilities for ventilation.

ACKNOWLEDGMENTS—It is a pleasure to record our indebtedness to Professor Earle B. Phelps, who inspired these studies, for his constant advice and encouragement. We also wish to acknowledge with thanks the interest of and assistance given by Deputy Commissioner of Health Sol Pincus, who was in charge of the Air Pollution Survey. Finally, the fine coöperation of Harry R. Saint, Project Engineer, A. C. Stern, Superintendent, and other members of the W.P.A. administrative staff deserves our appreciation.

REFERENCES

1. Pincus, Sol, and Stern, A. C. A Study of Air Pollution in New York City. *A.J.P.H.*, 27:321, 1937.

2. Safford, C. E., Sherman, J. M., and Hodge, H. M. Streptococcus Salivarius. *J. Bact.*, 33:263, 1937.

3. Hodge, H. M., and Sherman, J. M. Streptococcus Equinus. *J. Bact.*, 33:282, 1937.

4. Sherman, J. M., Mauer, J. C., and Stark, Pauline. Streptococcus Fecalis. *J. Bact.*, 33:275, 1937.

5. White, Elizabeth. On the Possible Transmission of Haemolytic Streptococci by Dust. *Lancet*, 941, 1936.

6. Brown, W. A., and Allison, V. D. Infection of the Air of Scarlet-fever Wards with Streptococcus Pyogenes. *J. Hyg.*, 37, 1, 1937.

Nutrition and Dental Caries*

BION R. EAST, D.D.S.

Technical Consultant, Vitex Laboratories, Inc., Harrison, N. J.

DIFFERENCES of opinion exist regarding the etiology of dental caries. Some insist that one type of bacteria is the cause of this disease which universally affects man; affecting him apparently, in direct proportion to the degree of his civilization. Others advance faulty oral hygiene, endocrinology, malformation, genetics, or malnutrition as the cause. Probably all these, and possibly other factors play a rôle. The neglect of any one factor during an investigation may lead to faulty conclusions.

The slogan "A clean tooth never decays" has been drummed into a believing public by some of the dental profession and commercial interests. Millions of dollars are spent annually for tooth brushes, dentifrices, and mouthwashes, but the incidence of dental caries keeps apace among our population at large.

The immediate cause of dental caries, when found, will probably be simple, and it will, when discovered, be of great interest. But from the public health standpoint, the pressing question is what can be done to help alleviate the condition at present.

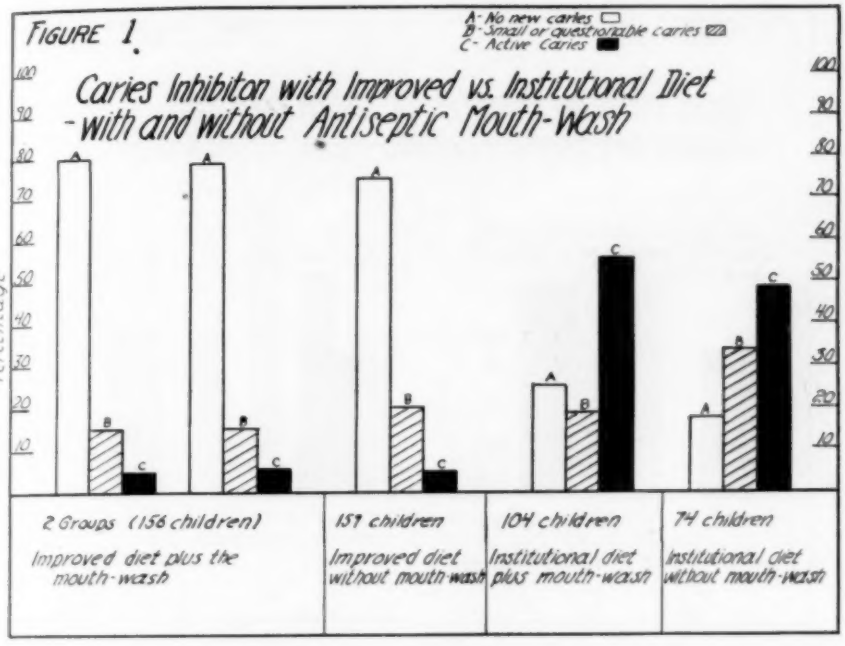
A review of the literature discloses few reports presenting valid data on this subject. Many papers are disregarded here because they present: (1) simply opinion; (2) the numbers in the experiment were too small to give significant results; (3) proper control was not exercised; (4) more than one variable was used in the same experiment; (5) when a vitamin (particularly vitamin D) has been studied, an assay of material was not made, therefore the potency of the material was unknown; and (6) vitamins D of different sources (vegetable and animal) have been considered as being identical.

After subjecting published studies to these tests, few investigations made on humans need analysis. Studies of children as outpatients are disregarded here because of the difficulties of imposing control. Animal experimentation is also disregarded because the final test of anti-caries control in humans should be controlled human experiments.

One study, that of Bunting, et al.,[1] is of particular significance because under controlled conditions 493 children, located in two orphanages, were used to determine the caries preventing and arresting properties of an institutional diet with and without the use of an antiseptic mouthwash, and that of an improved diet with and without the mouthwash. The study covered 2 years.

Figure 1 demonstrates the reported results. Those fed the improved diet with or without the mouthwash had practically the same results. The institutional (unimproved) diet groups —with or without the mouthwash had more new cavities and more active

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 7, 1937.



caries than those on the improved diets with or without the mouthwash.

The group fed the institutional diet with the mouthwash had more new caries and more active caries than the group fed the same diet without the mouthwash. One might deduct from this experiment that the mouthwash was caries-inducing. The significant results are the marked reduction in new caries in the groups which were fed the "well-balanced well-fortified" diet. This improved diet had as its base one quart of milk per day, with green vegetables and fruits. The improved or experimental diet was substantially that recommended by Boyd and Drain except that no added vitamin D was given.

McBeath [2, 3] reported studies to determine the caries preventing properties of diets. His investigations were made in orphanages in and about New York City. He noted that improving the diets resulted in a marked decrease in new carious tooth surfaces. He also observed that the dietary factor which was usually most deficient in an otherwise well balanced, easily obtainable diet was vitamin D. He reports significant success in caries control when various amounts of vitamin D are added to the diets.

Mellanby [4] and Anderson [5] have reported likewise.

In Figure 2 are shown some of McBeath's results. There is a definite decrease in the caries incidence in the groups receiving the diets with added vitamin D. The studies of the years 1930–1931 and 1931–1932 are particularly interesting because the same individuals used as experimentals were controls in the previous or the following year. The groups were reversed and the caries incidence was likewise reversed.

In 1934 McBeath [6] reported the caries inhibiting properties of graded amounts of vitamin D when given as vitamin D milk. The vitamin D milk supplemented the institutional or control diet. The results in caries control achieved with the experimental diets

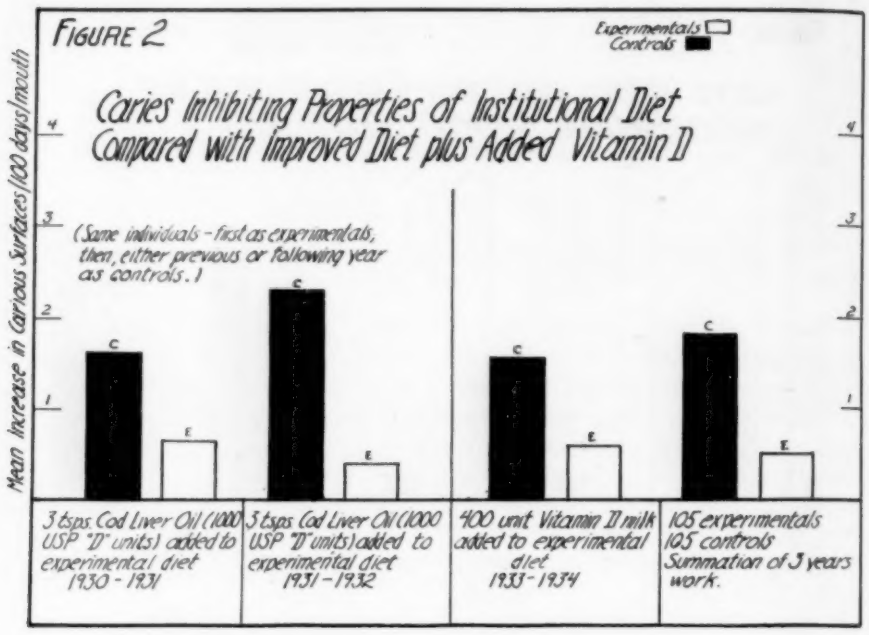


FIGURE 2
Experimentals
Controls
Caries Inhibiting Properties of Institutional Diet Compared with Improved Diet plus Added Vitamin D
Mean increase in carious surfaces/100 days/mouth
(Same individuals - first as experimentals, then, either previous or following year as controls.)
3 tsps. Cod Liver Oil (1000 USP "D" units) added to experimental diet 1930 - 1931
3 tsps. Cod Liver Oil (1000 USP "D" units) added to experimental diet 1931 - 1932
400 unit Vitamin D milk added to experimental diet 1933 - 1934
105 experimentals 105 controls Summation of 3 years work.

are contrasted with those on the control diets. The caries inhibition was in direct proportion to the amount of vitamin D given. The anti-caries effect of direct exposure of the skin to ultra-violet light was also demonstrated.

Since the publication of the McBeath 1933–1934 work, McBeath and Zucker[7] made further analyses of the data collected during the 3 year investigation. Through the extreme courtesy of the authors the data, in part, are here presented before publication.

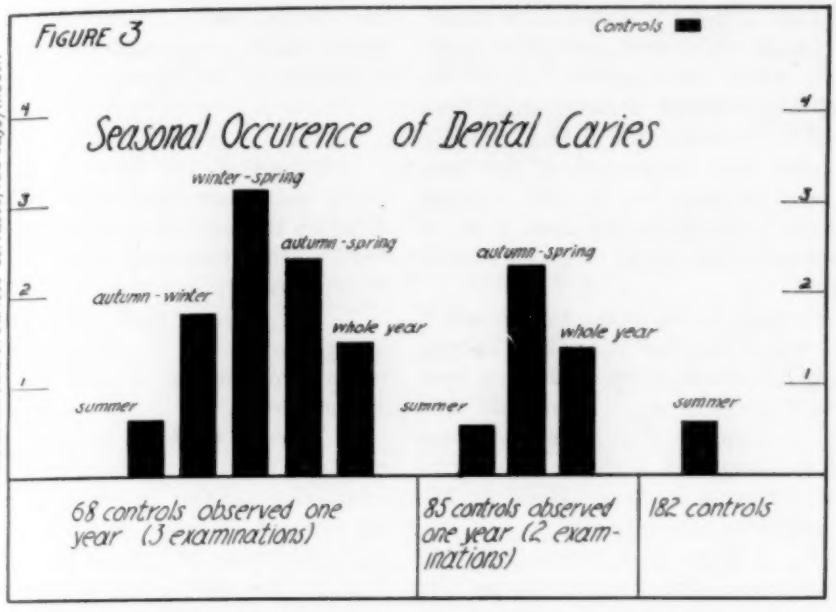
In all, over 800 children were observed. The children ranged in age from 8 to 14 years. They were about equally divided according to sex. They were all resident during the complete study period of orphanages where control could be established and maintained.

A notable contribution is observations of the incidence of caries during various seasons of the year. There is apparently a marked seasonable response. The period designated as autumn-winter covers about 100 days from the autumn examination. The winter-spring period ranges from the mid-winter examination to spring. Autumn-spring is a combination of the two periods.

In Figure 3 is shown the mean increase in carious surfaces per 100 days per mouth of controls observed over a complete calendar year and examined at various intervals. The highest incidence is during that period most remote from the summer.

In Figure 4, the seasonal response is again demonstrated together with the caries inhibiting influence of various amounts of vitamin D in the form of vitamin D milk. A like response was demonstrated when the skins were exposed to ultra-violet light.

Boyd and Drain of Iowa have reported observations of dental caries control over a period of years since 1928.[8, 9] Their data will not be discussed at length here. Their criterion has been the arrest of established dental caries rather than prevention of primary lesions involving the enamel.



They studied dentinal rather than enamel caries. This has led to confusion where the difference has not been appreciated by critics.

In brief, Boyd and Drain report that a well rounded diet, when actually consumed by normal children, will arrest established caries. The recommended diet is simple. It consists of the following essentials:

1 quart of milk per day
1 egg
1 ounce of butter
1 teaspoonful of cod liver oil (the year around)
2 vegetables (one being raw)
Fresh fruits

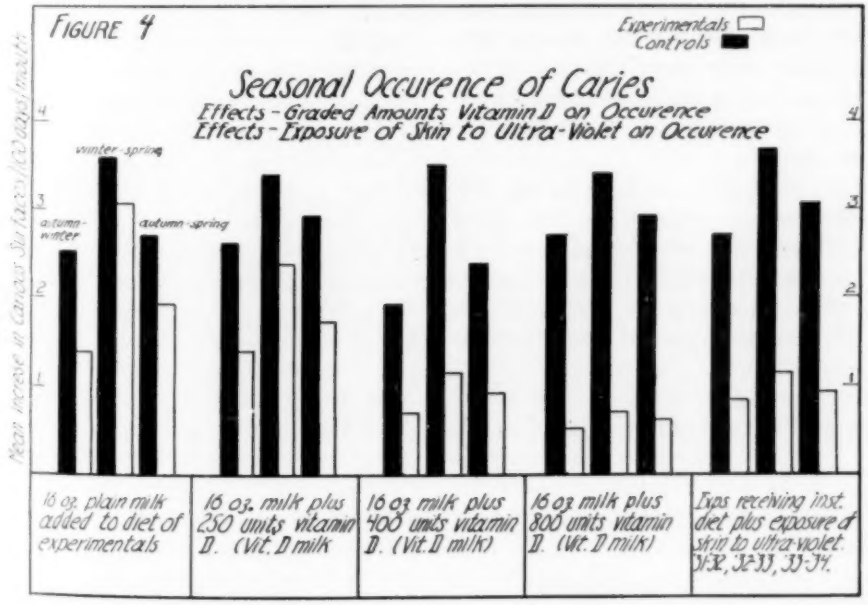


FIGURE 4
Experimentals
Controls
Seasonal Occurence of Caries
Effects - Graded Amounts Vitamin D on Occurence
Effects - Exposure of Skin to Ultra-Violet on Occurence
Mean increase in Carious Surfaces/100 days/mouth
winter - spring
autumn - winter
autumn - spring
16 oz. plain milk added to diet of experimentals
16 oz. milk plus 250 units vitamin D. (Vit. D milk
16 oz milk plus 400 units vitamin D. (Vit. D milk)
16 oz milk plus 800 units vitamin D. (Vit. D milk)
Exps receiving inst. diet plus exposure of skin to ultra-violet. W-F, J-J, J-J.

Candy is not prohibited *after* meals. In groups under well controlled conditions, where the consumption of the food was definitely known, arrest took place in 10 weeks' time. The "activity of caries was determined on the basis of the permeability of the exposed dentine to the exploring tine; if at all permeable the decay was considered active."

Recently, Boyd, Drain, and Stearns [10] reported a hospital controlled balance study on a small group of children from 3 to 6 years of age. The study covered 7 months. The individuals were fed in succession 4 diets. The principal difference in these 4 diets was the amount of vitamin D fed.

The children had active caries of the dentine. The criterion was activity of caries. During the 1st period, the children were continued (in the hospital) on the orphanage diet; during the 2nd the hospital diet except no added vitamin D was given; during the 3rd, irradiated milk with 155 units of vitamin D was substituted for the plain milk previously fed. Following these 3 periods the authors state: "For many weeks status was virtually stationary with minimal but definite activity, even after the children had received a diet of high protective value aside from its vitamin D content for 5 months."

During the 4th and final period, the children were continued on the same diet except the vitamin D content which was increased to 600 U.S.P. units per day in the form of cod liver oil. In this final study period after 9 weeks, the results were: "The caries was finally adjudged arrested and this was confirmed by subsequent examination."

SUMMARY

1. Improving the diets of children living under controlled conditions seems to lessen the occurrence of caries. These results seem uninfluenced by the use of an antiseptic mouthwash.

2. The seasons seem to affect the appearance of caries—that period most remote from summer having the greatest incidence.

3. Vitamin D seems to play an important rôle in seasonable caries occurrence; its presence in the body either as a result of direct exposure of the skin to ultra-violet light or by its inclusion in the diet, tends to lessen the seasonable variation.

4. A diet which is caries inhibiting without added vitamin D becomes more inhibiting when vitamin D is added either as cod liver oil or as vitamin D milk.

REFERENCES

1. Bunting, Jay, and Hard. *J. Am. Dent. Assoc.*, 18:672–78, 1931.
2. McBeath, E. C. *J. Dent. Res.*, 12:723–46, 1932.
3. McBeath, E. C. *New York State J. Med.*, 18:1086, 1933.
4. Medical Research Council (Final Report). "The Influence of Diet on Caries in Children's Teeth." *Special Report Series, 211.*
5. Anderson, Williams, Halderson, Summerfeldt, and Agnew. *J. Am. Dent. Assoc.*, 21:1349, 1934.
6. McBeath, E. C. *A.J.P.H.*, 24:1028–30, 1934.
7. McBeath, E. C., and Zucker, T. F. Unpublished (in press).
8. Boyd and Drain. *J.A.M.A.*, 90:1867, 1928.
9. Boyd, Drain and Nelson. *J. Dis. Child.*, 38: 721–25, 1929.
10. Boyd, Drain and Stearns. *Proc. Soc. Exper. Biol. & Med.*, 36:645–46, 1937.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. The By-laws of the American Public Health Association provide that no statements shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

EDITORIAL SECTION

MAZÝCK P. RAVENEL, M.D., *Editor*
REGINALD M. ATWATER, M.D., *Managing Editor*
AUGUSTA JAY, *Editorial Associate*

EDITORIAL BOARD

(Names to be announced)

VINSON-BARKLEY BILL

AMONG the resolutions adopted at the Association's 66th Annual Meeting in New York City during the week of October 4 was one supporting the Vinson-Barkley bill (H.R. 2711) as providing the best procedure and organization for lessening the danger to public health from stream pollution. This proposed federal legislation was passed by the House of Representatives on April 21 and by the Senate in amended form on August 16. The first session of the 75th Congress came to an end before agreement was reached by the House and Senate Conferees appointed to reconcile the differences in the bill as passed by the two Houses of Congress. Further consideration of a compromise agreement by the Conferees awaits the reconvening of the 75th Congress, either in the special session convened November 15 or in the regular second session in January, 1938.

The previous history of the Vinson-Barkley bill which will grant to the United States Public Health Service enlarged responsibilities and duties for coöperation with the states in water pollution control is of interest. The original bill was prepared and sponsored by the Committee on Stream Pollution of the Cincinnati Chamber of Commerce in January, 1936. Hearings were held by the Committee on Rivers and Harbors of the House of Representatives and by a sub-committee of the Committee on Commerce of the United States Senate on May 20 and 21, 1936, respectively. These committees of the 74th Congress reported out a substitute bill recommended by the Conference of State and Territorial Health Officers which was acceptable to the sponsors of the original bill. Before the adjournment of the 74th Congress in June, 1936, the bill had passed both the House and the Senate, but did not become law as it was delayed for reconsideration in the Senate, which was not reached before adjournment. Reintroduction in the 75th Congress has placed the proposed federal water pollution control legislation at a point where its fate depends to a great extent upon the action of the House and Senate Conferees when Congress next convenes.

The Vinson-Barkley bill as passed by the House of Representatives provides for federal water pollution control in accordance with principles which have led to success in other federal aid projects, which are as follows: (1) The stream pollution program is turned over to a long established federal agency in a regular

government department under trained career personnel who have had years of experience in working with state and local officials. (2) The federal government does not attempt to do the work of controlling stream pollution as actual abatement work will be done by the states, with the full coöperation and encouragement of the federal government. (3) The main basic principle is the matching of federal funds with states and municipalities, and the loaning of funds to state, municipalities, and industries for remedial treatment works involving financial participation and responsibility for the actual construction by the state and local agencies. (4) Funds are furnished the states through allotments to the state health authority for the maintenance of a continuous program of promotion, investigation, and planning.

The more important changes proposed in the Vinson-Barkley bill by the amendments added in the Senate are (1) granting of the consent of Congress for two or more states to enter into agreements or compacts for the abatement of water pollution, (2) classification of the navigable waters of the United States by watershed districts, (3) making of industrial polluters of navigable waters eligible for federal grants-in-aid for the construction of remedial treatment works, (4) establishment of limiting requirements for polluting material and for the extent of treatment needed in such navigable water districts, and (5) provisions for action in the federal courts for the abatement of water pollution when constituting a public or common nuisance as defined in the amended bill.

The acceptance of these amendments by the House of Representatives would make the bill more satisfactory to those groups favoring centralized governmental control of water pollution as contrasted with the views of its original proponents who advocate the principle of coöperation of the federal government for improved state control. These amendments would modify the two essential elements of the Vinson-Barkley bill necessary for constructive work in stream pollution control, which are (1) the strengthening of the state organizations so as to be able to respond to public demand for adequate enforcement of state laws and regulations, and (2) the availability of federal funds for loans and grants to states and municipalities, and loans to industry for stream pollution abatement.

Friends of the original Vinson-Barkley bill are reported to be of the opinion that the whole effort is likely to be lost unless the original bill without substantial modification is reported back to the Senate by the House and Senate Conferees. Acceptance by the House of Representatives of the amended bill as passed by the Senate is doubtful, for the House appears committed definitely to the principle of state control and abatement of water pollution. Moreover, there is serious question as to the constitutionality of federal court action in water pollution matters.

Members of the public health profession, who have definite views on the merits of state and federal control of stream pollution, would serve a useful public service by communicating their views to the House and Senate Conferees as it is quite likely that the bill will receive their attention as soon as Congress convenes. The House Conferees are headed by the Honorable Joseph J. Mansfield of Texas, Chairman of the House Committee on Rivers and Harbors. The Honorable Royal S. Copeland, United States Senator from New York and Chairman of the Senate Committee on Commerce is the ranking Senate Conferee. It would be unfortunate, to say the least, if this important and constructive federal legislation should fail at this time.

It is no exaggeration to estimate conservatively that the future abatement of water pollution on a broad comprehensive scale will be retarded by a decade or more if this meritorious legislation does not become law at this time.

STANDARD BIRTH AND DEATH CERTIFICATES

THE Bureau of the Census has sent out, within the last month, a set of three questionnaires, to obtain an expression of opinion on revision of the Standard Birth and Death Certificates and on the desirability of setting up a Standard Stillbirth Certificate. The questionnaires have been sent to public health agencies, county medical societies, specialized medical associations, schools of hygiene and public health, and many other organizations and individuals interested in public health and the collection of vital statistics. This represents a unique opportunity, to those in public health work, to have a part in the determination of what material is to be collected in vital statistics for the decennial period 1940–1950.

Upon the return of these opinions, a careful analysis is proposed by the Bureau of the Census, to be used as the basis for making up a set of preliminary forms. These preliminary schedules will then be sent to the various public health organizations for criticism and comment. After revision the new Standard Certificates will be recommended to the states for universal adoption for the next decade.

The major problems involved in revision of the present certificates are: improvement of the cause of death information, completeness on place of residence, determination of the need for a Standard Stillbirth Certificate, and simplification of the certificates without the elimination of desirable supplemental information.

There are many objections to the present statement, on the death certificate, of the cause of death questions. The chief objections arise from the difficulty in determining "primary cause of death." This difficulty is partly due to the lack of a time sequence for multiple causes. A definite time sequence would be of material assistance in determining the actual cause of death.

In reporting residence there has been some confusion among the doctors and others filling out the certificates. The confusion has arisen in differentiation of place of death or birth and place of residence. Many suggestions have been made to remedy this situation, among them one which would ask place of birth or death and residence in parallel columns with the same information for each.

The need for a stillbirth certificate has been discussed widely at meetings of the American Public Health Association and recommended by its sub-committees for adoption as one of the standard certificates.

The questionnaires suggest simplification of the birth and death certificates by placing only the basic legal information on the face and collecting important supplemental data, applying to but one cause or group of causes of death, on the back or on a supplemental schedule. The attention of those interested is directed to this important item on the questionnaire.

In view of the wide clearance being attempted, it is urged that all those interested in vital statistics and public health work send in their opinions promptly on the forms provided or write to the Bureau of the Census for a set of questionnaires.

PUBLIC HEALTH EDUCATION*

To Librarians, Research Workers, Students, and Health Education Workers:

In earlier years the annual index to the *American Journal of Public Health* carried no references to this "Education and Publicity" or "Public Health Education" department in the *Journal.*

This paragraph then supplements the index: starting with July, 1923, the department will be found in all issues, except in two of 1924, and one each in 1929 and 1935.

Children Have the Last Word—In England, according to the school medical officer of West Riding,

"dental propaganda might well be concentrated on the children themselves, rather than on the parents . . .

"The last word as to whether a child will accept dental treatment remains with the child in a majority of cases" says one member of the dental staff.

"The difficulty is probably not solely due to lack of parental control. There is a persistent tendency to regard dentistry merely as a service for the relief of pain and for purely cosmetic purposes."

In *Mother and Child,* 5, Tavistock Sq., London, W.C.1, England. *Nov.,* 1937. *9d.*

A Significant Amalgamation—Of great importance in the school health field is the step described in the following selected paragraphs:

On the 28th of June, the American Physical Education Association and the Department of School Health and Physical Education of the National Education Association were officially amalgamated to form the American Association for Health and Physical Education—a Department of the National Education Association. This merger (seeks) . . . to unite the efforts of health educators, physical educators, and leaders in school recreation under one organization. . . .

The reorganization carried over the larger part of the organization of the American Physical Education Association, with some changes and additions. The officers elected by the A.P.E.A. at the New York meeting were continued, as were the Governing Board and the Legislative Council. Three *divisions* were added: the Division of Health Education, the Division of Physical Education, and the Division of Recreation . . . four new sections were added under the Division of Health Education, as follows: (1) Health Education Teacher Training Section, Dr. C. E. Turner, Massachusetts Institute of Technology, Chairman; (2) School Physicians Section, Dr. Don W. Gudakunst, Department of Health, Detroit, Chairman; (3) School Nurses Section, Lulu V. Cline, South Bend, Ind., Chairman; and (4) Nutrition Section, Carlotta Greer, Cleveland, Chairman. These sections, with the Health Instruction Section with Major E. V. Graves of the State Department of Education, Virginia, as Chairman, form the Health Education Division under the chairmanship of Dr. Edna W. Bailey of the University of California, Berkeley, the immediate Past-President of the Department of School Health and Physical Education of the N.E.A. . . .

The new Association will continue to publish the *Journal of Health and Physical Education* and *The Research Quarterly,* and will carry on the work in physical education that was done in the past by the A.P.E.A. In addition, however, the American Association for Health and Physical Education assumes new and profoundly important tasks. First, the Association, through the Division of

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Health Education, hopes to give unity and leadership to much of the work in health education as it affects the school. To this end—just as the A.P.E.A. did and the new Association will continue to do with physical education national professional organizations—national organizations in the field of health education that are desirous of coöperating, are invited to become affiliated organizations, to have a voice in the Legislative Council, and to participate as organizations and as individuals in our work, our deliberations, our legislation, and our conventions—state, district, and national. In addition, we are hopeful that the experts in all fields of health education will coöperate with the Association in furthering the service to be rendered by the Association, without in any way lessening or limiting their services as individuals or through other professional organizations through which they have been accustomed to work. . . .

The merging with the National Education Association affects the Association most favorably. No limiting restrictions have been imposed. The same state, district, and national organizations and meetings will be continued and expanded to include health education and recreation in each constituent organization of the Association. In addition, the organized forces of the National Education Association will be at the service of the American Association for Health and Physical Education in every way possible. . . .

In *Journal of Health and Physical Education*, Ann Arbor, Mich. Sept., 1937. *35 cents.*

Again the March of Time—Any new "March of Time" with a health episode is a health education event of nearly world-wide significance. Shown in 7,847 theatres in the United States, just beginning in Canada, and in 3,227 theatres in other countries, we may assume that no other health education material reaches so widespread a popular audience.

Issue 4, volume 4, first released Nov. 26, 1937, carries "The Human Heart." The official synopsis is as follows:

Outstanding in this issue is another of those episodes dealing scientifically, but in layman's terms, with medical subjects for which The March of Time rapidly is becoming famous. In this instance the subject is heart disease—ailments of the heart and circulatory system. Only recently The March of Time was awarded the Clement Cleveland Medal of the American Society for the Control of Cancer in recognition of "the year's most effective contribution to cancer control"—an episode in a recent release called "Conquering Cancer."

There are several—to the layman—startling facts developed by pictures, charts and statistics in the present episode on heart disease. That heart disease leads the national death rate comes as something of a shock to the average man: 449,844 deaths in 1935, more than three times the fatalities attributed to cancer, which holds second place. Astonishing, although seemingly somewhat ironic, is the suggestion advanced by some specialists that the position held by heart disease as the U. S. No. 1 killer may really be due to beneficent causes, since thousands who might once have died young, now live to a ripe old age to succumb eventually to simple deterioration of the heart.

Greatest progress, however, has been made in controlling heart ailments of children. The familiar and once-neglected "growing pains" are now diagnosed as a symptom of rheumatic fever, menace to youthful hearts. The March of Time shows how science is treating children with crippled hearts, teaching them "a new way of life," so that they can face a future not of pain and sudden death, but a comfortable and confident life.

An extensive "Clip and Work Sheet," going to individual exhibitors, suggests ways of promoting local interest in the picture, including the coöperation of medical, health, and many other groups. A variety of advertising materials is supplied. The net result will be not only large audiences for the picture wherever shown, but also that millions will read in the advertising some of the pertinent facts. Truly "Time Marches On" for health education.

A Junior Board of Directors—The E.C.D. against tuberculosis among high school students started the idea out in Indiana.

The trend in modern education to encourage student participation and self direction may offer us new pathways to the problem.

One educator says: "The most hopeful development in student activities is the encouragement given them by intelligent and informed community leaders on the problems of today and the environment in which they live." He recommends that these young people be initiated into the skills and attitudes of adult life.

Why not encourage active participation in the tuberculosis program? Why not devise some method through which they can express themselves and evolve practices that will lead to action?

Schools and teachers are coöperating to the full. The tuberculosis association itself needs closer relations with the students. Board members are prominent and experienced in life. There is no representation of the 'teen age group.

Our horizon must be broadened to include this group, so why not a Junior Board? The conclusion reached by the St. Joseph County Anti-Tuberculosis League was such as to create such an organization by asking each one of the fifteen senior high schools to appoint, elect, or select in some manner one junior and one senior to represent that high school.

The superintendents of schools and high school principals were personally consulted regarding the advisability of such procedure, and we were highly gratified by their responsiveness. They gave it their unanimous endorsement and agreed that it was a constructive project from the standpoint of the schools.

What definite duties could be assigned to that body was the next question. A survey of present activities showed enough weak spots to offer an immediate solution to this problem.

The article lists the activities, and the reasons for seeking student responsibility for them, including state health poster contest, Christmas Seal newspaper, tuberculin tests, entertainments at the County Tuberculosis Sanatorium.

In its brief existence of 2 months the junior board has scored several times. In one direction:

Eighty-five per cent of St. Joseph County's high school seniors received tuberculin tests this year—with 4 high schools 100 per cent.

Then there was publicity.

From the standpoint of publicity alone the Junior Board has proved itself an asset to the Tuberculosis League. The two local newspapers as well as every high school publication have considered the organization of the Junior Board and its activities front page news. As one board member expressed it: "We found ourselves splashed all over the front page of the Hi-Times." Interviewed by their classmates and called upon for stories, the students have given the Tuberculosis League and its program wider publicity than it had ever before experienced.

Told by Irma Collmer, St. Joseph County Anti-Tuberculosis League, South Bend, Ind., in *Hoosier Health Herald,* 130 E. Washington St., Indianapolis, Ind. Nov., 1937.

"Any Number of Wives"—Lango, Uganda Protectorate, won a silver-mounted wall plaque for its share in Empire Baby Week. The response to infant welfare clinics led to a maternity and child welfare section of a health exhibition at Lira.

Prior to the occasion, publicity was arranged by circularizing the chiefs, by posters and propaganda at dispensaries and clinics throughout the district, and by a tour of the chief's headquarters by an assistant district commissioner about a fortnight previous to the show. The principal bait to lure mothers to Lira was a daily baby show on the first four days of the show. On one other day there was a competition for the healthiest family group consisting of a father with any number of wives and a quota of at least three children. The *bona fides* of each party had to be certified by the village chief. The baby shows were enormously popular, some mothers walking fifteen miles to attend. As they arrived, the mothers and babies were taken to a large hut built specially for the baby show and judging. This "baby banda" was reached by passing through a plot containing a model family dwelling. On leaving the baby show the people were directed through another plot containing a model maternity hut, showing the sanitary conditions that could be achieved for a confinement in a native hut. All the accessories were hygienic and efficient, but cheap. The baby's bath was a large gourd in a wooden frame.

Of particular interest was a kind of mannequin parade of hygienic dress for women. Lango women have only recently taken to wearing any clothes, and their tendency is to copy the clothing of the Baganda, which, though extremely graceful in their country, is not so well adapted to the needs of the Lango women, who spend much of their time on their knees grinding millet. A lady skilled in dressmaking was approached and produced several very attractive garments well calculated to suit the women's needs. The dresses were backless (as babies are carried on the backs and tend to soil the clothing), and were designed to allow easy accessibility to the breasts to facilitate suckling (it must be remembered that the ordinary Lango woman spends most of her adult life suckling a baby); other features of the "models" were short sleeves, short skirts, cheapness and adaptability to the figure, as the average Lango woman has a child once a year. The garments were available at from 1s. to 2s. at the local Indian bazaar. It is estimated that 50,000 natives attended the show during the whole period. The primary lesson stressed by the exhibits was the importance of good housing, and actual houses of a sanitary and enduring type were shown in course of construction. It is doubtful whether a health show has ever been arranged for people more primitive than the Lango. They are, however, making great strides toward improved methods of living.

In *Mother and Child,* 5, Tavistock Sq., London, W.C.1, England. *Nov.,* 1937. *9d.*

Workers Health Education—Studies in occupational disease, the effects of working conditions upon the workers, and provision of health education services are primary aims of the Medical Research Institute of United Auto Workers of America, organized in Detroit (Dr. E. R. Hayhurst, part-time Advisory Director).

Health education includes the preparation of educational material for distribution to locals and to shops, and provision of a consultation and educational service to shop stewards and locals who wish to use information for the improvement of working conditions.

In "New Vista in Detroit," by S. Kellman. *Social Work Today,* 6 E. 46th St., New York, N. Y. Dec., 1937. *15 cents.*

"Your Health" Continues—The current radio program of the American Medical Association is a threefold project. There are the weekly broadcasts; the monthly articles, and supplementary teaching material in *Hygeia;* and "Your Health: Pupil's Workbook and Guide." Large pages; outline for a self-appraisal and activities under each weekly topic; many blanks in which to write answers to questions; reading references, usually including page numbers. The weak point is the bibliography. Here are 53 titles, with authors, publishers, and dates. There are no prices or page numbers, and no indication of the contents, no suggestion as to what students or teachers are to do about the list. Not all of the references attached to the weekly units are to be found in this long list at the end.

Included are "Two to Six—Suggestions for Parents of Young Children," and "The Child From One to Six." One was published in 1933, the other in 1931. Shall teacher, or student, or school librarian choose "Two to Six" or "One to Six"? Shall we choose 1933 or 1931? And where would either volume fit into the broadcasting program? *Unhappily this bibliography follows precedent. We hope that a new precedent for health bibliographies will evolve from the pattern set by the American Child Health Association.*

Published by Johnson Publishing Co., 381 Fourth Ave., New York, N. Y. No price stated.

The broadcasts are booked for Wednesdays, 2:00 to 2:30 p.m., eastern standard time, over Red Network of N.B.C.

Contagious Diseases

January 5—Sneezes and Sniffles: Cause, spread, prevention of colds, pneumonia and

influenza; importance of early medical care.

January 12—Scarlet Fever, Measles and Whooping Cough: Modern attitudes toward these diseases; their prevention by community coöperation.

January 19—Smallpox and Diphtheria: Unnecessary diseases; preventable by immunization of infants.

January 26—Poliomyelitis: Information about the disease; coöperation with President's Birthday Ball.

Preventing Future Illness

February 2—Rheumatism and Arthritis: Known factors in the causation of arthritis and its care.

February 9—Healthy Hearts and Arteries: Known ways of protecting the heart against infection and hygienic abuse; how to live with heart disease.

February 16—Don't Fear Cancer—Fight It: Known factors in the cause, prevention and treatment of cancer.

February 23—Overcoming Diabetes: Individual efforts plus medical aid will win against diabetes.

Public Health

March 2—Water, Waste, and Sanitation: Importance of community control of water supplies, sewage disposal and general sanitary matters.

March 9—Protecting Perishable Foods: What the community can and must do to protect fresh foods such as fish, fruits, vegetables, meats, bakery goods.

March 16—Keeping Books on Health: The meaning and the importance of vital statistics, contagious disease reporting and community health records.

March 23—Catching Disease from Animals: Rabbit fever, rabies, undulant fever and similar infections, and what can be done about them.

"Ye Greate Stinking Poisonous Weed"—Quoted from the *New Haven Town Records,* May 23, 1653, this phrase is supposed to refer to the ragweed of 1937. And in 1937, as in 1653, the citizen of New Haven was urged in a well written statement to eradicate the "weed which grows against his own ground." In *Health,* New Haven Dept. of Health, Aug., 1937. Old records and old newspaper files may provide texts for any health agency.

Emphasis on the extending range of ragweed is given in "War on Ragweed," by H. B. Anderson. *Health,* Toronto, Ont. Sept., 1937.

That ragweed "is the cause of approximately 80 per cent of all cases" of hay fever is not recognized widely enough.

A School Safety Display—How DeWitt Clinton High School, New York City, put on a safety exhibition is described, with 5 large pictures, in "Visualizing Safety Education," by E. H. Hastings. *Journal of Health and Physical Education,* Ann Arbor, Mich. Nov., 1937. *35 cents.*

It was hoped that the exhibit would serve a threefold purpose: first, to bring home the need for safety education; second, to demonstrate graphically safety practices; and third, to indicate the interaction between school and community organizations in making America safety conscious.

Our exhibit was a coöperative affair. Teachers and students drew the preliminary plans. Pupils selected aspects of safety education for individual study. A large committee of students served as receptionists, guides, curators, and handymen. The exhibit was held in one of our gymnasiums. Popular and community interest was so high that the exhibition hours were rearranged to give all parents who so desired an opportunity to attend.

Our hygiene students contributed an array of posters, notebooks, soap models, and original photographs. The chemistry department assisted with an exhibit on drugs and explosives. The general science department snooped around the rooms and corridors, exposed Petri dishes, and showed cultures grown from bacteria picked up on these jaunts. An excellent photographic study of safety devices in use throughout the school was submitted by the physics department.

The school custodian dramatized school and pool sanitation. Students in the art department built a miniature city. The city had skyscrapers, a model business district, and suburban homes complete even to the flower gardens. Miniature autos and pedestrians indicated traffic problems. Safety placards were very much in evidence.

The city police department had a giant display which occupied an entire section of the gymnasium. Pictures, posters, and a con-

tinuous movie reënforced their plea for safety. Two officers were on hand all through the week to lecture on traffic rules and regulations. So well did they do their task that by the end of the week not only had they befriended 6,000 boys, but they had put their message across!

Space does not permit proper mention of all the exhibits. Foreign safety posters added a colorful, thought provoking note. The American Red Cross showed safety devices for water and land. Many other organizations helped.

After our exhibits had been properly mounted, we threw the gymnasium open to students, teachers, and outside visitirs. Hygiene, civics, English, and general science classes attended under the guidance of their teachers. Each pupil was asked to comment briefly on the particular exhibit which pleased him most. He was also asked to make an inventory of safety hazards encountered in his own environment. This last assignment proved to be as much of an education to our teachers as it did to the pupils. Our teachers tended to think of safety in such vague terms as street safety, or home safety. Our students were much more specific. Fire, electricity, swimming, flies, sanitation, vehicles, camp, were a few of the topics our boys covered. As a final step, a committee of boys and teachers made a survey of safety hazards in Clinton. Their report was mimeographed and posted in each room.

When You Get to New York—When you plan visits to 50 West 50th Street, where the national health agencies are located in Rockefeller Center, you will wish to schedule a stop at New York Museum of Science and Industry. At least if you pass the entrance to the Museum, at the western or 6th Avenue end of the R.C.A. Building, the visible moving displays will draw you inside.

The continuous, but partly changing, displays in the Museum appeal to practically everyone. And there are examples suggestive to everyone concerned with exhibits.

The newest exhibit is the "Story of Man," built by the German Hygiene Museum at Dresden. About 100 units of "action-exhibits and dramatized displays" illustrate anatomy and physiology. Included are the following: blood circulation demonstration, cell model, embryos, additional spalteholz specimens, flow of the blood, the seat of important body functions in the brain, sleep requirements at different periods of life, organ of equilibrium, mechanism of speech, respiration in rest and motion, work distribution and assimilation in the human body, joint articulation, operation of the digestive system, mastication, cross-section book (carved and painted cross-sections of the body), gland secretion, thyroid gland, organs of the senses, and so on.

Many of the action displays, such as that of the heart which is over-size, are in continuous motion. Others can be set in motion by pressing buttons. There are devices by which each person can test for himself the soundness of his senses and the strength of his muscles. By pressing a button and placing the nose close to an aperture, you can test, for example, your ability to distinguish between such odors as flowery, fruity, putrid, and burnt. A diagram of the tongue enables you to see just where you become aware of the tastes of sweet, sour, salt, and bitter.

And of course there is a copy of the famous "transparent man."

A catalogue of the "Story of Man" exhibits will be sent upon request to the New York Museum of Science and Industry, Rockefeller Center, New York, N. Y.

Publicity Against Syphilis—The recommended anti-syphilis program to be conducted jointly in Indiana by the Medical Association and the Department of Health includes the following:

Since publicity is the essence of salesmanship, it is the opinion of this committee that a very large state-wide committee be appointed. This committee should consist of a physician duly appointed by each medical society in the state of Indiana. It should also consist of every health officer in the state. In addition to this committee, which shall be known as the "state-wide committee," sub-committees shall be appointed by

the state committee members. These sub-committees shall function in the communities in which they exist. It would be well to have in the membership of these sub-committees heads of hospitals, heads of nursing associations, social service workers, such as the head of the Community Fund, Boy Scouts, Girl Scouts, Young Hebrew Association, the Y.W.C.A., Y.M.C.A., Catholic lay organizations, etc. The larger each committee becomes, the greater will be its salesmanship ability in the community. These committees would be able to carry out the plans advocated by the state-wide committee.

Since publicity should be in the hands of the health department, it would be the duty of the state board of health to call the large state-wide committee into session and outline to them the definite plans which have been worked out by the medical association, through its committee for the control of syphilis, and the state board of health. The state committee can place in the hands of the sub-committees valuable information to be distributed in their communities. Through the agency of the state committee members (doctor and health officer) in the community, public meetings can be held with the sub-committees as a nucleus of attendance. Films, exhibits in the nature of poster displays, etc., can be obtained from the state board of health.

In *Journal* of Indiana State Medical Assn., Hume Mansur Bldg., Indianapolis. Aug., 1937.

The Health Officer Reports—The Public Health Education Section meeting in the A.P.H.A. Annual Meeting are well and generously reported in *The Health Officer* (Nov., 1937), U. S. Public Health Service, Washington, D. C. The report of the opening session brings out the lack of agreement or of understanding as to what health education is or what it should accomplish.

Is it not possible to get a certain number of people to go to a clinic, to be immunized, to give up coffee, and to have a bowel movement every day—in short to adopt certain health practices—without educating? Some people can be belabored or frightened or "campaigned" into action—at least temporarily. Are they any more "educated" to this practice than the majority of automobile drivers who refrain from parking in restricted areas because they know they'll get a ticket? Hence considering the objectives of health educational effort solely on the basis of the number of clinic attendances, number of diphtheria immunizations, or tuberculin tests seems inadequate. The panel brought forth no other basis for the evaluation of educational effort.

Also in this issue:

"Keeping Up With the Job" (a project in staff training in New York City Dept. of Health) . . . "Education Has 'Quacks' Too" (which should remind us to check up on any new source of information or help in health education).

Health Education in Nov., 1937, Journal—In *American Journal of Public Health*, Nov., 1937:

"Results of Mass Education for Tuberculosis Presentation in Detroit," by Vaughan, Harmon, and Molner (pp. 1116–1123).

"Education in Nutrition by Private Agencies," by Tobey (pp. 1124–1128).

"Results of Publicity" as to venereal diseases (p. 1128).

In "Prevention of Poliomyelitis" (p. 1164) mention of interest aroused by "recent widespread publicity."

Under "Sir Robert W. Philip—World Benefactor" (pp. 1168–1169) are the facts about "a semi-centennial of great social importance."

Under "A National Health Campaign" (p. 1172) is a brief mention of an English effort.

Under "Books and Reports" (p. 1182) see review of "The Traffic in Health."

Three health education items appear in "A Selected Public Health Bibliography" (pp. 1188–1189).

Under "Association News" (p. 1193) are listed 25 new members of Public Health Education Section; "Georgia Public Relations Bureau" (p. 1200); and a new director of health education under "Western States" (p. 1204).

Hygeia, December, 1937—Topics and titles in this issue:

Elixir of sulfanilamide deaths and new legislation (of timely importance) . . . "Chasing the cure" (a review of tb. facts) . . . Slimming scientifically . . . The truth about candy . . . Mates or mismates (what makes the difference) . . . Animals' aid to science (animal experimentation) . . . Paralysis at birth . . . Lighting the schoolroom . . . New books on health . . . Problem child or problem parents? . . . X-rays when cancer comes . . . Your mouth tells of general disease . . . Bad habits in good babies . . . Oliver Wendell Holmes (medical scholar) . . . Questions and answers.

In "School and Health":

Building the health curriculum in the high school . . . Field trips in health education (Camden, N. J., high school) . . . Some of our health needs (a teaching plan) . . . Energy foods for growth . . .

Under "Your Health" are 7 pages on the A.M.A. radio program, with material for school use. The topics are listed through the middle of June, 1938. Reprints of the school material are supplied at *5 cents*, 25 for *50 cents*. American Medical Assn., 535 N. Dearborn St., Chicago, Ill.

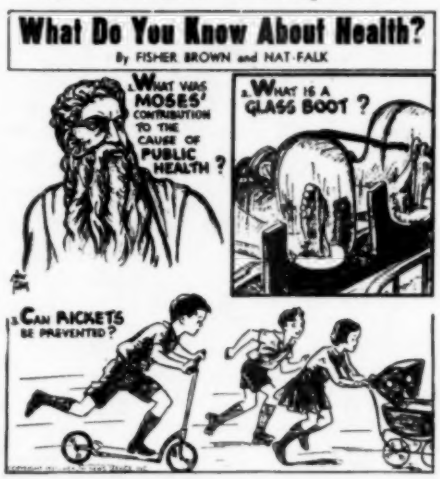
Letters and Good Will—Letters play a large part in both administration and education. In both they have to do with good will. Everybody is doing it—practically all staff members are writing letters. And letter writing is a technical job. It combines writing ability, with a fine sense of public relations. Few of the writers have had training, rules, or advice.

Leaders in business and industry have long been concerned over the quality of the everyday letters which help to create mental pictures of the firm and its business. Extensive campaigns of education and inspiration are conducted among writers of business letters. At last we have a pamphlet on creating good will for health and social work through the everyday letter writing of the agencies. "Letters and Good Will," by Hilary Campbell, is for every health worker and office worker who writes letters. Social Work Publicity Council, 130 E. 22d St., New York, N. Y., will send a copy for *35 cents*.

Again if we follow big business, some of us will discuss our letters in meetings of the professional and clerical staffs. A clinic session or a group of recent letters might be highly illuminating. Such chapter headings as "Style in Letter Writing" and "Opportunities to Win Friends" suggests discussion topics, in addition to such as these: "Over-worked words," "What to do about technical words." "What are technical or professional words to the layman?"

Health in Newspapers: Part 2—This month we reproduce a non-comic cartoon series, "What Do You Know About Health?" This is supplied to newspapers by Health News

FIRST CARTOON—Release September 13


What Do You Know About Health?
By FISHER BROWN and NAT FALK
1. WHAT WAS MOSES' CONTRIBUTION TO THE CAUSE OF PUBLIC HEALTH ?
2. WHAT IS A GLASS BOOT ?
3. CAN RICKETS BE PREVENTED ?

Answers: 1. As a hygienist whose influence has made itself felt throughout the world, and as the first maker of sanitary laws, Moses may properly be regarded as the father of preventive medicine.

2. A contrivance that has worked its miracle of healing in countless cases where frozen feet might have led to gangrene. It has helped many suffering from arterial disease. The glass boot stimulates circulation by means of gradual and rhythmic alternation of air pressure.

3. Decidedly. No child who gets his necessary quota of calcium, phosphorus and Vitamin D is plagued by rickets—a disease of the bones. Vitamin D is easily obtainable in cod-liver oil, Vitamin D milk and direct sunshine. Calcium and phosphorus have their richest source in milk. Vitamin D milk prevents rickets.

Service, 22 E. 40th St., New York, N. Y.

National Health Library—Located at 50 West 50th St., New York, N. Y., is a coöperative activity of the National Health Council. Is it as generally known as it should be?

It was established in 1922 by the consolidation of the libraries of four of the organizations included in the Council. It is supported by special contributions from member agencies and membership fees. While the collection is primarily for the use of the staffs of the supporting organizations and their members, it is open for reading and reference use, with certain restrictions, by any one interested in public health and allied subjects. The Library now contains about 6,000 volumes, 30,000 pamphlets and 500 periodicals including health bulletins and reports from states and principal cities.

The chief distinction of the National Health Library is its index of current periodical health literature, which is the most complete of any library in the United States. This is kept in the form of a card catalog.

Beside general public health and personal hygiene the main subjects covered are blindness prevention, child health, health education, mental hygiene, nursing, nutrition, personal health, public health nursing, psychoanalysis, sex education, tuberculosis, social hygiene and venereal disease prevention.

The Library does not have any pamphlets for free distribution or sale. It does have available or will compile bibliographies and reference lists on special subjects at a nominal cost.

Loan privileges are granted to those who are individual members of the following supporting organizations: American Public Health Association, American Social Hygiene Association, National Committee for Mental Hygiene, National Organization for Public Health Nursing, National Society for Prevention of Blindness, National Tuberculosis Association.

Others pay an annual fee of $3. There is also an annual corporate membership of $10 which permits, in addition to the privilege of borrowing books, special use of the Library, with certain restrictions.

Every Friday there is issued a four page mimeographed *Library Index* in which reference is made to the more important and interesting articles appearing in the current magazines received in the Library. References are included to city and state health bulletins not indexed in any other place. The subjects used are the same as those covered by the Library collection. The annual subscription is $2.50 for those not on the staff of the supporting agencies.

The Library is open from 9 to 5 Monday to Friday; 9 to 1 Saturdays. Isabel L. Towner is Chief Librarian; Eva R. Hawkins, Associated Librarian.

MOTION PICTURES

The annual awards for the best amateur movies of the year include two by dentists, each presenting technical dental material. Such awards may suggest anew that there are possibilities in amateur films as teaching material for local as well as state staffs, and groups of coöperating agency staffs. The "best" pictures are described in *Movie Makers*, 420 Lexington Ave., New York, N. Y. Dec., 1937.

"1000 and One: The Blue Book of Non-Theatrical Films." The most extensive list of such films, on a wide range of subjects, with number of reels, content, nature of film, distributors, prices. Includes: embryology, anatomy, and structural physiology, eyes, feet, teeth, hair, child hygiene, food, personal hygiene, public hygiene, safety and accident prevention, fire prevention, nursing, first aid, life saving, disease and its treatment, medicine and surgery, parent education, psychology. *Educational Screen*, 64 E. Lake St., Chicago, Ill. 100 pages. *75 cents; 25 cents* to subscribers to the magazine.

"Public Health in New York State" is the movie answer to those who ask what the State Department does. The picture runs about 20 minutes; is available in 16mm. and 35mm.

This is the first motion picture with sound produced entirely by the department through its Division of Public Health Education. It is developed around the district plan of health organization, with emphasis on the work of various divisions, as it is administered through the district health officers. Activities of 8 of the divisions are presented in detail, while work of the remaining 4 is covered in outline.

"What's in a Dress" is a new movie of the Woman's Bureau, Washington, D. C. It is a silent picture, and loaned, either narrow or standard width, to any interested organization willing to pay the nominal transportation charges both ways. In this review of problems in the clothing industry, sweat shop work in a tenement is pictured.

Among resolutions passed at the 1937 meeting of the Department of Visual Instruction, N.E.A., was the following:

WHEREAS, the Visual Instruction Department deplores the indiscriminate use of motion pictures in the school, therefore, be it

RESOLVED, that it urges greater attention be given by school toward securing and using only those motion pictures which are suited to the mental and maturity levels of pupils, and be it further

RESOLVED, that the department recommend that greater care be taken to distinguish more clearly between motion pictures used for specific classroom purposes and those more general motion pictures useful for auditorium or assembly activities.

The extent to which big business is making use of the motion picture is illustrated in a recent magazine advertisement. There were included pictures of the 212 sound projectors bought by one well known firm, the 110 projectors sold to another, the 104 to a third, and so on.

"Getting Started with Titles" is a brief, informal account of how one man undertook to make his own movie titles. Others may benefit by his experience. *Movie Makers,* 420 Lexington Ave., New York, N. Y. Dec., 1937. *25 cents.*

In this department we have urged motion picture production as a health education project in schools. Now we have "The Movie Club as a Visual Education Project," by L. C. Spires. Tells how a club was organized to back the whole school curriculum; how the costs are met by public exhibitions. In *Educational Screen,* 64 Lake St., Chicago, Ill. (Nov., 1937; *25 cents*):

> The equipment for producing 16mm. films is not elaborate or costly. Excellent cameras may be purchased for about the same price as a good snapshot camera. All of the other accessories including tripods, tilting stands, developing reels, and tanks, can be made. Our total outlay, exclusive of camera and projector, was less than $5. This outlay enabled us to film pictures suited to our own particular needs which could not be procured elsewhere at any price. The possibilities are practically unlimited.
>
> Is it within the scope of high school boys and girls? The films are of vital interest to them and they take pride in the making of their own movies. Has the club any value to the school and to the boys and girls of the club? The films are educational in nature and are produced to meet the particular needs of the classroom teacher. It would be difficult to over-estimate the value to the club members. . . .

SCHOOLS AND CHILDREN

"Alcohol and Narcotic Drugs," by Dr. Haven Emerson. *Journal, National Education Assn.,* 1201 16th St., N.W., Washington, D. C., Sept., 1937. *25 cents.* "An urgent problem in health education"—and why.

"Evaluation of a Rural School Health Education Project," by Strang, Grout, and Wiehl. First of a series dealing with evaluation of the experimental school health education project in Cattaraugus County rural schools. *Quarterly,* Milbank Memorial Fund, 40 Wall St., New York, N. Y. Oct., 1937. *25 cents.*

"Dental Health in Elementary Schools." Massachusetts Dept. of Public Health, Boston. Facts, teaching principles, teaching materials; table of contents and index. For teachers who need help most the reference lists could have been annotated to advantage. As is so frequently the case, although addresses are given for book and pamphlet publishers, periodicals are listed without addresses.

"Headed for Healthful Living," by M. B. Rappaport. *Journal of Health and Physical Education,* Ann Arbor, Mich. Nov., 1937. *35 cents.* Outlines 8 essentials in a health teaching program; describes some applications in typical schools. Also: "A Sex Education Program," by H. C. Leibee. Reviews the need; states a wide range of community and school activities in education and prevention. In "Healthy Endings," H. T. Smith describes a "health game" or knowledge test which we should like to see in use among adults as well as children. A set of sentence beginnings parallel a set of endings, but not in the same order. Problem: which ending goes with which beginning. To use in classroom or elsewhere the two parts might be offered on written or mimeographed sheets. Or, the children might draw or cut out illustrations, mount them on cards, so that the two sets could be matched. Or, as an exhibit, the endings might be mounted on two revolving drums, mounted side by side, so that visitors could match them, a matched set to be supplied to every one who makes the try.

"Preparing Future Citizens to Support Public Health Measures," by Sally Lucas Jean. *Education.* May, 1937. Adequate school health examinations, and effective teaching of personal and public health needed if future citizens are to value properly public health services. Reprint from the author: 200 Fifth Ave., New York, N. Y.

In *Public Health Nursing,* 50 W. 50th St., New York, N. Y. *(35 cents):*

Sept., 1937: "Building for Health in a Secondary School" . . . "Health Explorations of Eighth Grade Children" . . . "The Nurse's Contribution to Health Education" . . . "New Ways for Old in Rural School Health" . . . "Present Trends in Health Education."

Oct., 1937: "Approaches to Sex Education in the Schools" . . . "Who Is Prepared to Teach Health?"

Nov., 1937: "Habit Training During the Preschool Years."

REPORTING

As usual the opening feature of the East Orange, N. J., Board of Health report is a diagram based on the *Appraisal Form.* Here we have the total score of 932, and the details in black and white bars for vital statistics, infant hygiene, etc. Popular health instruction is missing, but gets two pages of text, and a photograph of the Information Room, "to which the public first comes as it enters the building" and which "continues to serve a useful part in education."

The annual report of Visiting Nurse Assn., 205 W. Main St., New Britain, Conn., is printed on one sheet which is folded so that it makes 12 pages, 3½ by 9 inches, with a 3 page spread of pictures entitled "Serving New Britain in Sickness and Health." One page is used for the mailing addresses.

Health, Lansing, Mich., for Oct., 1937, is an extensive, profusely illustrated number commemorating the 30th anniversary of the Michigan Tuberculosis Association.

"The Health of Madura City," reports activities of the Health Department of that far southern India community. The health education record includes cinema shows (510), magic lantern demonstrations (288), lectures and talks (3,847), each about doubling over the preceding year.

The mimeographed report of the Los Angeles, Calif., County Health Dept. explains that the Bureau of Maternal and Child Hygiene "is largely an educational activity in instructing mothers in the proper care of their children, as well as many other types of maternal and child health problems. For this reason a great deal of work is done with schools, women's clubs, and organizations of a similar type."

"A New Day Dawns for Birth Control" is the "concluding report" of the National Committee on Federal Legislation for Birth Control, 17 W. 16th St., New York, N. Y. This "summary of 7 years which led to legalization and cleared the way for an epoch-making advance" is largely a record of education, propaganda, and of legislative effort—which is largely educational.

Possibly the simplest form of annual report to be mailed without an envelope is that of the Public Health Nursing Assn., 519 Smithfield St., Pittsburgh, Pa. Concise report paragraphs are headed: "Highlights," "We Point With Pride," "We View With Alarm," "We Look Ahead."

A two year report makes up the Oct., 1937, issue of *Bulletin,* American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y. There are paragraphs on exhibits, talking film slides, and film strips issued by the society.

The 1936 report of the Newton, Mass., Health Dept., contains a two page table of contents, with all subheadings under the main chapter headings. This seems more useful in a small city report, than the index which is so needed in the reports of larger cities and states. Health education includes professional, nursing, and general. Under the last is brought out the limitations experienced in the smaller city overshadowed by a big neighbor. The last chapter is made up of brief reports of health work by local voluntary agencies.

"Report for the First Half of 1937 on the Project of Arousing and Developing Citizen Interest in and Support of Work for the Control of Syphilis in New York State, outside of New York City." An 11 page mimeographed report of the State Committee on Tuberculosis and Public Health, S.C.A.A., 105 E. 22d St., New York, N. Y. This report may serve as a useful check list illustrating the range of activities and educational materials to be drawn upon by other health agencies.

"Statement of Membership and Activities, 1937–1938," National Health Council, 50 W. 50th St., New York, N. Y. Reporting the N.H.C., with a page or two on each of the member agencies, national health associations, their nature, services, etc.

When "contents" may fail to grasp its opportunity for usefulness is illustrated by a department of hospital report. The "contents" reads:

> Introduction, page 6; Divisions, page 7; Institutions, page 43; Capital Outlay Budget, page 78; Coöperating Groups and Agencies, page 82; Department Progress, page 89.

There are 28 divisions, and 29 institutions to be located by the above "contents," without an index.

DATES AHEAD

Sometimes you get health agencies represented on committees for celebrations conducted by other groups. Sometimes a press release, an interview, the caption to a photograph, will make a health tie-up. Or you may send a letter of suggestion which carries over your idea. Again, a little celebration by your own staff may serve the purpose.

International Leica Exhibit, Jan. 8–15, 1938, International Bldg., Rockefeller Center, New York, N. Y.

Jan. 17 and 18, 1938, Conference on Better Care for Mothers and Babies. U. S. Children's Bureau, Washington, D. C.

Jan. 22 is anniversary of organization of first free school dental clinic in America. Consult Children's Aid Society, New York, N. Y.

Child Labor Day, Jan. 29, 30, or 31, 1938. Write National Child Labor Committee, 419 4th Ave., New York, N. W. Send *25 cents* for packet of child labor literature.

Feb. 2, 1938, will be the second *National Social Hygiene Day*. Address: American Social Hygiene Assn., 50 W. 50th St., New York, N. Y.

Candlemas or "Ground-Hog Day," Feb. 2. Whether it does, or does not!

Feb. 10, anniversary of *opening of first modern hospital*. See "News Almanac for Social Work" (Community Chests and Councils, 155 E. 44th St., New York, N. Y.). Consult American Hospital Assn., 18 E. Division St., Chicago, Ill.

Feb. 13, 1938, *Race Relations Sunday*, introducing *Interracial Week*. Address: Dept. of Race Relations, Federal Council of Churches. 297 4th Ave., New York, N. Y.

St. Valentine's Day, Feb. 14, may be given a health slant.

May 15, 1938: Closing date for Competition in Small Sculptures in White Soap. Address: National Soap Sculpture Committee, 80 E. 11th St., New York, N. Y. For students, sanatoria patients, and others.

FOR REFERENCE OR EDUCATION

Of course the notes which appear from time to time under this heading should be classified, and more fully annotated. Satisfactory classification for all the audiences among our readers is not possible here. What could be educational in one group would be quite out of place with another.

We here seek to do little more than to make the wide range of material accessible to planners, writers, executives, teachers, and others, who in turn may be expected to select and to describe what will best serve the needs of their respective groups.

Again we would suggest that a single copy, or a half dozen copies, of a selected publication may be used to splendid advantage toward interesting an influential individual, or in helping the leader of a group.

"The A-B-C of Syphilis." New Jersey State Dept. of Health, Trenton. 7 pp. "What the average person should know about a very dangerous and prevalent disease" appears on cover page. Examples:

Accidents are often the direct result of Syphilis.

Advertised drugs for self-treatment of Syphilis are dangerous. Avoid them.

Adequate medical treatments are the only way to cure Syphilis.

Alcohol and Syphilis are close companions.

Again C. LeRoy Baldridge, so well known for his posters and book illustrations, has painted a poster for the N.O.P.H.N. A public health nurse at the door of a home being welcomed by the children—beautifully executed in four colors on fine quality heavy stock. There is space in which to localize poster. *50 cents;* 12 or more, *25 cents*. N.O.P.H.N., 50 W. 50th St., New York, N. Y.

"Citizen Support in Syphilis Control," by Homer Folks. *Venereal Disease Information*, Supt. of Documents, Washington, D. C. Oct., 1937. 5 cents. How individuals and groups coöperate to advantage.

A clever use of humor to point a health moral is to be found in a reprint, "Thank God for Lip-Rouge," from *Health Officers News Digest*, 30 Rockefeller Plaza, New York, N. Y. *Free*. An effective adaptation has been made in the form of a display card 11 by 14 inches.

"Equipment for a Nursing School Library," by S. T. Smith. *Am. Journal of Nursing*. Aug., 1937. May be useful outside of the nursing school field.

"Experimental Syphilitic Keratitis in the Rabbit," by Dr. A. J. Gelarie, 52 W. 74th St., New York, N. Y. Reprint.

From "abscess" to "yellow fever," from the communicable diseases of childhood to the trend of longevity, a wealth of statistical reference data is contained in "Twenty-Five Years of

Health Progress," by Louis I. Dublin and Alfred J. Lotka. Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y.

"Low Cost Food for Health." An attractive looking pamphlet of 75 pages with food, meal, marketing, and cooking information; two-thirds devoted to recipes; a detailed table of contents for the recipes in the back (even though it happens to be labelled "Index"). Community Health Assn., 137 Newbury St., Boston, Mass. *25 cents?*

"Maternal Care," by Dr. F. L. Adair, University of Chicago Press, Chicago, Ill., for American Committee on Maternal Welfare. Basic principles for the professional.

"Milk Control: Governmental Regulation of the Dairy Industry in the U. S." Public Administration Service, 850 E. 58th St., Chicago, Ill. *75 cents.* What federal, state, and local agencies are doing; regulations; laws, surveys, etc.; special chapter on publicity and educational work.

"Need for More Nutrition Education." Dairy Council Digests, National Dairy Council, Chicago, Ill. *Free.*

"Practices and Experiences of the Lavanburg Homes." Lavanburg Foundation, 132 Goerck St., New York, N. Y. A housing experiment for the real "slum" dwellers.

"Public Health Work Helps Private Practitioners," by F. M. Houser, M.D. *Health Bulletin.* State Board of Health, Raleigh, N. C. Dec., 1937. A good case is made for public health departments.

"Transiency: A Public Health Menace." Tuberculosis Abstracts, National Tuberculosis Assn., 50 W. 50th St., New York, N. Y. Oct., 1937.

A triple letter-sheet spread of well arranged newspaper clippings. Henry Street Visiting Nurse Service, 99 Park Ave., New York, N. Y.

"Vitamin Content of Foods," by Daniel and Munsell. Supt. of Documents, Washington, D. C. *15 cents.* Professional study.

"The Wonderful Story of Life." U. S. Public Health Service. A parent's talks with children regarding life and its reproduction. Supt. of Documents, Washington, D. C. 18 pages. *10 cents.*

List of publications. Social Work Publicity Council, 130 E. 22d St., New York, N. Y. Dec., 1937. *Free.*

American Medical Assn., 535 N. Dearborn St., Chicago, Ill.:

"Gonorrhea," by Warner and Warner, and "The Gonococci," by H. L. Herschensohn. *15 cents.* . . . "Syphilis," by Warner, "Spirochaeta Pallida," by Herschensohn, and "The Wassermann Test," by Kolmer. *15 cents.*

American Social Hygiene Assn., 50 W. 50th St., New York, N. Y.:

"Prostitution in the U. S.," by Bascom Johnson. *10 cents.* 18 pp. . . . "A Current View of Prostitution and Sex Delinquency," by Bascom Johnson. *10 cents.* 14 pp. . . . "What You Should Know About Syphilis and Gonorrhea," by M. J. Exner. 72 pp. *15 cents.* . . . "The Newest Generation," by William F. Snow. *10 cents.* 9 pp. . . . "The Drama of Syphilis," by C.-E. A. Winslow. *10 cents.* 16 pp. . . . "Social Hygiene and the Public Mind," by David Resnick. 10 pp. *10 cents.* Reviews progress against syphilis discussion taboo.

Children's Bureau, Washington, D. C.:

"Home Play and Play Equipment" . . . A group of separate charts and tables on maternal mortality for statements comparing cities and states, etc. . . . "A General Plan and Objectives of a Maternal and Child Health Program" (reprint) . . . "Suggested Methods of Improving the Health of the American People" (reprint) . . . Development of a Leisure-Time Program in Small Cities and Towns." . . . "Esta Vd. Edugando a Su Nino a Ser Feliz?"

National Tuberculosis Assn., 50 W. 50th St., New York, N. Y.:

"The Tuberculin Test" (4 p. folder).

"The Double-Barred Cross: Symbol of the World-Wide Campaign Against Tuberculosis" (3 p. folder; significance, history, and use).

Reprints (*10 cents* each) from ***Public Health Nursing,*** 50 W. 50th St., New York, N. Y.:

"Community Partners" (chests and v.n. assns.) . . . "Study Outline: Lay Participation in Public Health Nursing" . . . "Building for Health in a Secondary School" . . . "New Ways for Old In Rural School Health" . . . "A Program for Staff Education: Pneumonia."

CONVENTIONS: PAST AND FUTURE

At the *sixty-third annual meeting* of New Jersey Health and Sanitary Assn.: A continuous program of 12 motion pictures . . . microscopic exhibits by Bureaus of Venereal Disease Control and Bacteriology of State Dept. of Health . . . "Health Education in Its Broader Aspects," by Dr. Livingston Farrand. From *Health Progress,* Freehold, N. J. Nov., 1937.

On the program of the annual Illinois State Conference on Public Health: "Community Education in Communicable Disease Nursing."

Why not do something about the next state meeting of social workers, or any state or national meeting of health workers? Why not have a health education and publicity session? Breakfast, luncheon, or informal dinner?

If you have no other idea for a program offer "Question and Answers." Invite questions in advance. Have your questions written out ready to start the meeting. The audience will quickly supply more questions. The chairman can answer some questions and get the audience to help. A committee of two or three could help the chairman handle the questions.

Merely opinion questions could be answered by raising hands. How many believe so and so? How many believe something else?

MAGAZINE ARTICLES

"Condition Satisfactory," by Dr. Sandor Pudor. A Viennese physician has written of his own physical and psychological reactions to three operations. "Sight Without Glasses," by Dr. H. W. Peppard. The use of exercises. "Man, Bread and Destiny," by Furnas and Furnas. What man does to food; what food is doing to man. Condensed in *Book Digest,* 350 E. 22d St., Chicago, Ill. Dec., 1937. *25 cents.*

"The Heritage of Ignorance," by G. Zilboorg. *Atlantic Monthly,* Boston, Mass. June, 1937. *40 cents.* Includes psychiatry. Quotes Artemus Ward on ignorance as not lack of knowledge, but as "knowing so many things that ain't so."

"Hope for Crippled Children," by Dr. W. R. Ramsey. *Farmers Wife Magazine,* St. Paul, Minn. Dec., 1937. A copy *free* to a health worker.

Life, in its Nov. 29, 1937, issue gave 8 pages to tuberculosis and the Christmas Seal. The publishers sent a copy to each state tuberculosis association and tuberculosis sanatorium.

Six picture pages about tuberculosis (including a half page picture from that time when tuberculosis patients "drank the blood of freshly slaughtered cattle to give them strength"); and 2 pages of open-air treatment in Europe; 3 pages of fire and water life saving; 16 facts about bathing a baby. *Look,* Des Moines, Iowa. Dec. 7, 1937. *10 cents.*

"Syphilis." Two book reviews by Ira V. Hiscock. *New Republic,* New York, N. Y. Oct. 6, 1937. *15 cents.*

Reviews of the current books on syphilis have added immensely to the magazine and newspaper space given to the subject.

BOOKS AND REPORTS

Clinical Parasitology—*By Charles Franklin Craig, M.D., Colonel U. S. Army (Retired), and Ernest Carroll Faust, Ph.D. Philadelphia: Lea & Febiger,* 1937. 733 pp. Price, $6.50.

This new textbook by leading American authorities on tropical medicine and parasitology from the Tulane University School of Medicine is intended for practising physicians, medical students, and other students of these subjects. It is a well balanced volume covering the fields of protozoölogy, helminthology and entomology as they apply to the animal parasites of man and their vectors. It is divided into three sections, one for each of the above divisions of the field, and is supplemented by an appendix describing the technic of collection, preparation and identification of the parasites, and giving a list of representative specimens desirable for teaching and the *International Code of Zoölogical Nomenclature.* Finally, there is an extensive reference list of textbooks, journals, and references to the subject and a complete index.

Colonel Craig has prepared the section on protozoa and Dr. Faust the sections on helminths and arthropods. Each section is introduced by a general consideration of the morphology, biology, and classification of the parasites concerned, and each sub-group of parasites is introduced by a zoölogical classification. The individual parasites are treated from the historical, geographical, and morphological points of view; their habitats, life histories, and epidemiology are described; their pathological effects on the host and the clinical symptoms produced are presented; and methods of diagnosis described, followed by a consideration of treatment and prevention. The many previous first-hand studies and publications of these authors in their respective fields and their activities in teaching and research work up to the present time have insured a completeness of authoritative and correct presentation of facts which could hardly be exceeded at the present time. Colonel Craig has especially drawn upon his expert knowledge of amebiasis and malaria, using much of the material on amebiasis which appeared in his recent volume *Amebiasis and Amebic Dysentery,* and Dr. Faust has reproduced and brought up to date much of the subject matter in his volume *Human Helminthology.*

The value of the book is enhanced by a judicious use of tables and by 243 engravings, both original drawings and photographs, and many others borrowed from other publications. The book is remarkably free from statements of doubtful facts, argumentative points, and typographical or editorial errors.

The reviewer is in agreement with nearly all of the points of view expressed as far as his familiarity with the subject is concerned. In the consideration of the pathology of visceral Leishmania infection more emphasis might have been placed upon the almost exclusive participation of the reticulo-endothelial cells throughout the body and the paralyzing effect of the infection on the bone marrow, producing a reduction in platelets and a prolonged bleeding time as well as a secondary anemia and leukopenia. In the treatment of Leishmania infections the modern use of pentavalent antimony preparations replacing the use of tartar emetic might have received

greater emphasis. In the treatment of hookworm, carbontetrachloride is listed among the drugs advocated without emphasizing its occasional fatal toxicity and without warning against the use of fats and alcohol in the diet close to the time of administration. Preliminary purging is advocated in connection with all anthelmintics although it is generally conceded that this is unnecessary with some anthelmintics and is often harmful with carbontetrachloride. In connection with the bite of the black widow spider the statement is made that the site of the bite becomes red and swollen, whereas in the reviewer's experience there is usually no local inflammation whatsoever. The rise in blood pressure associated with this condition, which is of diagnostic importance, is not mentioned.

The book is beautifully printed and bound and both the authors and the publishers are to be congratulated on its accomplishment. It will undoubtedly become a standard textbook in its field.

HENRY E. MELENEY

Feeding Behavior of Infants—*By Arnold Gesell and Frances L. Ilg. Philadelphia: Lippincott Co.,* 1937. 201 pp. Price, $4.50.

With characteristic thoroughness and scientific precision, Gesell and Ilg have produced a book which should be of absorbing interest to physicians, nurses, and educators. Strictly speaking, it is not a book on infant feeding. Feeding is simply one of the behavior reactions in the growth of the total personality of the child. The authors succinctly describe the volume as "A Pediatric Approach to the Mental Hygiene of Early Life."

The book incorporates the results of an enormous amount of research carried out through the Yale Clinic of Child Development in coöperation with the Visiting Nurse Association and the Well Baby Conferences of New Haven. The same use of pictorial illustrations is made as was used so extensively in Gesell's *Atlas of Infant Behavior*. One hundred and thirty-two well selected, unique photographs are included in the present volume.

Part I treats of the behavior aspects of nutrition, Part II of the growth of feeding behavior, and Part III of the regulation of feeding behavior. An appendix rounds out the volume with interesting and instructive illustrative biographies of actual feeding cases. A selected bibliography of the important contributions in this field increases its usefulness. The book is well arranged for reference and is beautifully printed.

RICHARD A. BOLT

Anatomy and Physiology of Physical Training—*By Major R. W. Galloway. Baltimore: Wood,* 1937. 182 pp. Price, $2.50.

This brief, condensed treatise attempts to cover in Part I the principles of anatomy and physiology as related to physical training. Part II presents the practical application of these principles to training.

Among others, it has a chapter on breathing exercises and one on corrective exercise. Its major objective is in the field of body mechanics. It seems too sketchy to give real grounding and application.

CHARLES H. KEENE

Some Fundamental Aspects of the Cancer Problem—*Edited by Henry B. Ward. New York: Science Press,* 1937. 248 pp. Price, $2.50.

The general interest in cancer has led to the publication of this supplement to Volume 85 of *Science* containing 31 papers or abstracts of papers read at the Atlantic City meeting in December, 1936. The first group concerns heredity and constitutional fac-

tors. Maud Slye summarizes her work with the statement that malignant disease is transmitted through the genes as a recessive character and that carcinoma, sarcoma and leukemia have different general and localizing characters. She believes that there is no evidence of the operation of an extrachromosomal factor.

On the other hand, C. C. Little believes the evidence shows that the most important influence in determining the incidence of breast cancer, although it has a genetic basis, is evidently affected by factors of the internal environment and that evidence is steadily accumulating to support the hypothesis advanced by Tyzzer in 1915 that the cancer cell differs from the normal by a process of mutation.

Clara Lynch believes that the results of her studies on spontaneous lung tumors in mice shows that heredity plays some part in controlling the appearance of tumors in this organ.

On the other hand, the very extensive work of Bullock, Curtis, and Dunning, studying tumors produced by known agents such as cysticercus larvae, a parasite which develops in the liver, and also some of the carcinogenic hydrocarbons, points to the fact that the possibilities of cancer development must be a universal cell characteristic and that the histogenesis of the tumors is determined by the fortuitous exposure to an irritant of the various types of cells which characterize neoplasms in general.

F. C. McDowell concludes that the incidence of leukemia is determined by intrinsic and extrinsic factors, but he also shows that even in a genetically uniform strain of leukemic mice not all develop the disease.

The second group of papers discusses the artificial production of tumors and is prefaced by a paper on the synthesis of a large number of fairly simple hydrocarbons contained in the phenanthracene group.

F. C. Wood discusses the great variety of tumors which have been produced in animals and calls attention to the fact that it has not been possible as yet to produce neoplasms in cells growing in culture though exposed to a potent carcinogenic agent.

R. S. Ferguson calls attention to the fact that the malignant tumors of the testes are neoplastic growths of the germ cells and hence give rise to tumors of a teratoid nature.

H. J. Bagg follows with a demonstration of the production of a teratoma in the testicle of the fowl by the injection of a zinc chloride.

J. B. Murphy reports on his studies of the stimulating and inhibiting agents obtained by the use of various cell extracts.

Finally, the volume contains a series of studies on the production of high voltage radiation, the determination of X-ray qualities by filters, comparative effects of neutrons and X-rays on tissues, biological effects of alpha particles, and ends with some excellent statistical and general papers. The whole offers a good cross-section of cancer research at the present time.

FRANCIS CARTER WOOD

Malaria in Europe — *By L. W. Hackett. New York: Oxford University Press,* 1937. 336 pp. Price, $3.75.

Dr. Hackett's book is a valuable contribution to the book-shelf of the malariologist, the physician, the public health worker, and the layman interested in controlling the disease. The style is delightfully easy and the illustrations are well chosen.

Although Dr. Hackett has thoroughly documented his narrative and demonstrated his points by citing other experiences as well as his, yet he presents his theories and conclusions as entirely

his own. This lends much to the clarity and value of the book.

In discussing the epidemiology of malaria, showing its dependence upon the relation of the habits of the insect carrier to the habits of man, Dr. Hackett discloses the distinctive habits of the newly discovered races of *A. maculipennis*. In describing the ebb and flow of the disease in Europe through the centuries, he recounts briefly the controversies over anophelism without malaria and over zoöphilic barriers as controls. He shows how the recently acquired knowledge of the distribution of each race of maculipennis ends these controversies.

The complexity of the malaria parasite and the rôle of immunity are delightfully treated. His discussion of the variation of strains within each species of plasmodium clears up many misconceptions by giving accurate descriptions of parasite reactions to given treatments. We welcome such a brief resumé of a voluminous literature.

All physicians in the South and all malariologists should read the chapter on "Treatment in Theory and Practice." Those interested in attempts to control malaria infection rates by means of any anti-malaria drug should carefully study it. Here is given a well digested view of the rôle, dosage, and duration of treatment of each of the anti-malarials and their respective efficacy for each species of plasmodium as well as a clear discussion of cases which depart from the rule. He differentiates between temperate climate malaria (with a winter season of no transmission) and the same disease with its different manifestations under tropical conditions. He explains clearly how to appraise a malarial situation and summarizes the determining factors in selecting a method of control for any malaria project.

Dr. Hackett discusses what results may be expected from drainage, larvicide application, or screening, without distracting the reader's attention by lengthy descriptions of the minutiae of each method of anopheline control.

The book concludes with two thoughtful illustrations of unusual though logical methods of meeting two different malaria situations—solutions arrived at from a careful study of epidemiological data rather than the haphazard application of any standard control measure.

LOUIS L. WILLIAMS

Childbirth Yesterday and Today—*By A. J. Rongy, M.D. New York: Emerson,* 1937. 192 pp. Price, $2.00.

Safely Through Childbirth—*By A. J. Rongy, M.D. New York: Emerson,* 1937. 192 pp. Price, $2.00.

These companion volumes give a concise description and a clear picture of the progress of midwifery and obstetric practices throughout the centuries. They elucidate step by step the application of scientific methods to the solution of difficulties encountered in childbirth.

The historical narrative is presented delightfully and is illustrated with telling pictures. A sketch of the history of child care with reference to the father as well as the mother makes interesting and instructive reading. Brief, well balanced chapters on birth control and childbirth today are included.

Safely Through Childbirth is a practical small volume on prenatal, natal, and neonatal physiology and hygiene. It describes in non-technical language the changes involved in the organism in motherhood, stressing the importance of prenatal and postnatal care. A timely chapter on abortion is included.

The convenient size and composition of these two volumes should assure them a place in the educational efforts

now being made for the prevention of maternal mortality and morbidity.

RICHARD A. BOLT

Textbook of Psychiatry—*By Arthur P. Noyes, M.D. (2nd ed.) New York: Macmillan,* 1936. 329 pp. Price, $2.50.

This book does unique justice to the field of psychiatric nursing and, indeed, in synoptic form, to the broad field of general psychiatry. This second edition represents a thorough revision of the previous text. Not only does this book pay respect to increasing knowledge which has been rapidly enhancing psychiatric usefulness, but also gives a commendable psychiatric attitude and insight which may be termed "constructive psychiatric intelligence."

Of particular note is the attention paid to the common maladjustments of life, the significance of behavior and personality manifestations observed in the wards and clinics of general hospitals as well as those in connection with mental hospitals. The author's conception of mental health as a real and individualistic matter, together with emphasis upon the integration concept, is indeed noteworthy.

The nurse's own rôle is understanding her personality development not only from the standpoint of self improvement or social adjustment and individual efficiency but also because of her influence upon the lives of those she serves, receives critical amplification in the final chapter, The Nurse and Her Profession.

The explicit style of the writer makes the reading of this text both interesting and easy to grasp. The genetic-dynamic approach to each of the subjects discussed is in keeping with present-day psychiatric knowledge and practice. The author is wholesomely eclectic in his attitude toward the various schools of psychiatry but seeks to bring to the surface the core of their respective contributions in the light of possible usefulness to the nurse.

A well chosen glossary and index conclude the book. The references for further reading at the end of each chapter have been critically chosen although certain typographical errors in respect to names no doubt will be corrected in succeeding revisions.

FREDERICK L. PATRY

Junior Clothing—*By Kate W. Kinyon and L. Thomas Hopkins (rev. ed.). New York: Sanborn,* 1937. 262 pp. Price, $1.16.

Once there was a book *Junior Foods and Clothing*. Now each subject has been elaborated into a separate book. *Junior Clothing* is a 9 chapter textbook for use in junior high school home economics classes. The subjects developed are use, appearance, design, color, textiles, under-garments, selection, repair, and how to fit the clothing problem into the family scale.

Within the clothing situation as it now exists, these titles are developed in great detail even unto "rhythm in arranging lines and spaces." The text, however, makes no attempt to correct existing foolish practices, as for example, why men should slavishly continue to wear neck-choking shirts and ties, heat-retaining vests and coats, and monkey jackets. Most of the book, unfortunately, is for that sex which is already too far ahead of the other in matters of health, comfort, variety, and particularly appearance of clothing. The authors missed an opportunity to help the mere males. W. W. PETER

Junior Foods—*By Kate W. Kinyon and L. Thomas Hopkins (rev. ed.). New York: Sanborn,* 1937. 362 pp. Price, $1.16.

This is a companion book to *Junior Clothing*, and is likewise designed for general use as textbook in junior high school home economics. The 8 units

cover necessary foods, breakfast, lunch, dinner-choices, the why of preserving foods, food purchasing, cooking utensils, recipes in food preparation.

The authors have stood commendably adamant against yielding to the ballyhoo of Hollywood diets, food faddists, and some of the more insidious council-approved commercialized food advertising. An example is the subject of vitamins so vitally invigorating to all of us, especially to various manufacturers. It is strenuous enough for even the professionally trained to keep up with the vitamin procession. The authors have fortunately avoided confusing children's minds with too much technical material. They mention the alphabetical list of vitamins, tell what regulatory stunts they perform in the body, list the variety of overlapping foodstuffs harboring these elemental substances, and let it go at that before all interest on the part of the child is lost. In like manner the essential salts are reviewed.

The illustrations are particularly interesting because the subject of food use lends itself to startling photographic contrasts—big and little rats, pigs, dogs, and children, all snapped just as they stand to show the difference between right and wrong feeding.

There is so much good material in this book that one can forgive the continued use of doubtful material such as the 4 pages of height-weight-age tables for boys and girls lifted from ancient traditional sources and printed without reference to variations due to racial stock and physical build.

W. W. PETER

Principles and Practice of Public Health Dentistry—*By J. A. Salzmann, D.D.S. Boston: Stratford,* 1937. 584 pp. Price, $4.00.

As far as our reading goes, this book in its entirety covers a new field, or perhaps it is more correct to say that the author has gathered and put under one cover subjects which until this time it has been necessary to search for through quite extensive literature.

"Dental public health is presented from an evolutionary standpoint in Part I; from the professional viewpoint in Part II; from the viewpoint of Public Health in Part III; while Part IV constitutes a handbook on dental public health practice." It would be hard to say which of these is the most interesting. It is perhaps safe to say that the first part covers ground which is less generally known to the medical profession, at least, than the others. Parts II, III, and IV are eminently practical, but also contain a great deal of history, especially Parts II and III.

From the standpoint of the readers of this *Journal,* probably Part III, which deals with the public health aspects of dentistry, is the most important, but all hang together to make an excellent whole. Part IV gives the program for dental public health, which is well thought out and practical. It contains chapters by Dr. Harry Strusser, Chief of the Dental Division, Bureau of School Hygiene of the Department of Health, New York City; and by Dr. John Oppie McCall, Director of the Murry and Leonie Guggenheim Dental Clinic.

We consider this book one of unusual value, which we hope will be read by health officers and public health workers generally. It is a strong plea for the recognition of oral hygiene and dentistry in our programs of public health. The author emphasizes, very properly in our opinion, the discoveries of dentists and the part they have played in proving the relationship of the condition of the mouth and teeth to the general health. It is true that in some ways they have in the past gone too far, but a better understanding of their attitude and facts on the part of the medical profession might have

saved us from the orgy of tooth pulling for the cure of every ailment to which flesh is heir—now happily a thing of the past.

The book is well and interestingly written. The author does not hesitate to show up some of the failures of the profession in the past, but, as already pointed out, also tells us of its triumphs and sacrifices, which mark it as a decidedly human document.

The illustrations are excellent and the book is well documented, with a bibliography at the end of each section. A good index adds to the value of the book. We wish for it a wide circulation among all public health workers and health officers, and also in the medical profession.

MAZŸCK P. RAVENEL

Research Memorandum on Social Aspects of Health in the Depression *By Selwyn D. Collins and Clark Tibbits. New York: Social Science Research Council,* 1937. 192 pp. Price, $1.00.

Research Memorandum on Crime During the Depression—*By Thorsten Sellin. New York: Social Science Research Council,* 1937. 133 pp. Price, $1.00.

These two volumes are part of a series of 13 monographs on the social aspects of the depression published by the Social Science Research Council under the direction of its Committee on Studies in Social Aspects of the Depression. The purpose of these is not so much to gain new information as to survey existing data, discover unfilled gaps in information, and suggest practicable research problems.

The problem set by Collins and Tibbits is to explore the fields of health measurement, measure changes in the health environment, and assess changes in organization and methods of preventing and treating illness. Recognizing the difficulties in establishing standards of physical fitness in terms by which the health status of populations may be measured, the authors suggest that changes in health may best be determined indirectly through variations in mortality rates, sickness rates, and prevalence of physical defects including malnutrition and underweight. The principal indexes of health measurement suggested are: (1) infant neonatal and maternal mortality and stillbirths; (2) general mortality rates; (3) morbidity or sickness rates; (4) accidents; (5) nutrition, height and weight. The principal sources of data relative to the above indexes are indicated and methods of using them to evaluate changes in public health during the depression are suggested.

The second part of the study is concerned with changes which may have taken place in the public health as a result of alterations in the economic status of large groups in the population. The writers point out that changes in income and economic status are significant only in so far as they affect the fundamental factors necessary to health, such as food, shelter, clothing, and other conditions necessary to health maintenance. Since such changes probably take place as the proportion of the population living at or below subsistence levels changes, research is suggested along 4 lines: (1) minimum subsistence incomes; (2) consumption levels; (3) occupational environment or working conditions; (4) changes in the social environment. The third line of investigation suggested is a study of recent changes in community technics for providing facilities for the prevention and treatment of illness.

The emphasis in this as well as other volumes in the series is placed on research. The authors have done an excellent job in making available the results of a great many important investigations, locating the primary sources of data and suggesting research

problems which seem likely to throw light on what has happened to the public health during the depression. Researchers will find the study an invaluable guide. Its greatest value lies in orienting the student in the field and showing him the directions in which future research seems to hold the greatest promise.

In the second memorandum Professor Sellin outlines a research program for the study of the possible effects of the depression on crime trends. Since the law defines the nature of crime, the author believes that any study of trends must begin with an examination of the changes in the law itself. We need to know what conduct, previously legal, is now criminal, as well as what illegal conduct has been dropped from the law. We need to know what changes have taken place in the severity of penalties imposed by the law before we can estimate the changes which may have occurred in the amount of crime during the depression. In chapters two and three, studies of the relation between economic fluctuations and crime, in Europe as well as in the United States, are reviewed. The results of these studies, most of them made before the depression, are rather disappointing. They indicate the almost insuperable difficulties of attempting statistical measurements of such complex relationships as may exist between crime and economic change. Some of the basic difficulties in such statistical correlations are set forth in the next chapter on the "index question." The final problem suggested is an analysis of administrative agencies; the police, the courts, and the penal and correctional institutions and agencies. In the last chapter Professor Sellin suggests some next necessary steps in research to test the validity of a series of common theories concerning the effects of economic fluctuations on crime. The value of this memorandum lies in showing how little we know scientifically concerning matters about which opinions are so commonly and so dogmatically held. C. T. PIHLBLAD

Federal and State Control of Milk Prices—*By James A. Tobey, Dr.P.H. Chicago: International Association of Milk Dealers,* 1937 42 pp. Price, $2.00.

This concise volume supplements effectively *The Legal Aspects of Milk Control* by the same author. Members of the dairy industry as well as milk control officers will find useful this discussion of government regulation of milk prices and the production and distribution of milk. The volume reviews the Constitutional status of laws fixing prices and regulating the production and distribution of milk as shown by court decisions. IRA V. HISCOCK

An Introduction to the Social Studies—*By Joseph K. Hart, Ph.D. New York: Macmillan,* 1937. 203 pp. Price, $2.00.

While this book is not concerned primarily with the public health, it is a book that every public health worker should read. The author modestly calls it an elementary text book for professional and preparatory groups. While this may define its roots, the ramifications of its branches cover most of the problems of a modern democratic order and give us an excellent picture of contemporary social problems.

The chapters on "A Healthy Social Order," and "Our Social Profession," should prove especially helpful to those who are trying to clarify their social vision. The book is written in an easy style and its chapter divisions are arranged to carry the reader along from one interest to another. Each chapter is followed with suggestions for further study, and a selected book list appears at the end of the volume.

RICHARD A. BOLT

Russian **Medicine (Clio Medica)** —*By E. Horsley Gantt. New York: Hoeber,* 1937. 214 pp. Price, $2.50.

The little volume is more than a history of Russian medicine. It is also a thumb-nail sketch of the history of Russia as well. The reviewer read this book with great interest. It contains a great deal of solid information regarding Russia and recounts enough dramatic incidents to save it from being too heavy.

All references to Russian medicine inevitably contain a eulogy of Pavlov just as similar books on medicine in Spain emphasize the importance of Ramon y Cajal. This is, of course, as it should be, but it also emphasizes the sterility of medicine in these two countries.

The last chapter in the book on Soviet Medicine should be of particular interest to many American physicians who fear that attempts are being made to Sovietize American medicine. The impression that one gains from reading this book is that the general health of the Russian people has improved under the later years of the Soviet regime as well as the average standard of medical service. One also gains the impression which coincides with that of many medical travelers to the Soviet Union that in the scientific and clinical work the workers impress the visitors more with their enthusiasm than with their critical judgment.

This book of Dr. Gantt's can be heartily recommended as both interesting and informative. It belongs to the series, "Clio Medica," edited by E. B. Krumbharr, M.D. RALPH H. MAJOR

BOOKS RECEIVED

HOW TO USE PICTORIAL STATISTICS. By Rudolph Modley. New York: Harper, 1937. 170 pp. Price, $3.00.

THE MIND OF MAN: THE STORY OF MAN'S CONQUEST OF MENTAL ILLNESS. By Walter Bromberg. New York: Harper, 1937. 323 pp. Price, $3.50.

MODERN WAYS WITH BABIES. By Elizabeth B. Hurlock. Philadelphia: Lippincott, 1937. 347 pp. Price, $2.50.

EMOTIONAL HYGIENE: THE ART OF UNDERSTANDING. By Camilla M. Anderson. Philadelphia: Lippincott, 1937. 242 pp. Price, $2.00.

THE NURSERY YEARS. By Susan Isaacs. New York: Vanguard Press, 1936. 138 pp. Price, $1.50.

MUIR'S BACTERIOLOGICAL ATLAS. Second Edition. Atlas Enlarged and Text Rewritten by C. E. van Rooyen. Baltimore: Wood, 1937. 90 pp. Price, $5.25.

CHILD LABOR AND THE NATION'S HEALTH. By S. Adolphus Knopf. Boston: Christopher Publishing House, 1937. 32 pp. Price, $.50.

MAN, BREAD AND DESTINY. By C. C. Furnas. New York: Reynal and Hitchcock, 1937. 364 pp. Price, $3.00.

A PRIMER FOR DIABETIC PATIENTS. Sixth Edition Revised. By Russell M. Wilder. Philadelphia: Saunders, 1937. 191 pp. Price, $1.75.

SOME FUNDAMENTAL ASPECTS OF THE CANCER PROBLEM. Edited by Henry Baldwin Ward. New York: The Science Press, 1937. 248 pp. Price, Cloth $2.50, Paper, $2.00.

PERSONNEL POLICIES IN PUBLIC HEALTH NURSING. By Marian G. Randall. New York: Macmillan, 1937. 170 pp. Price, $2.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

How to Get Parents' Consents—How one health officer put some quite ordinary health educational measures to work and the good results he got. The moral is that we are not so much in need of elaborate and novel educational technics as we are of using the measures already tried out in the hard school of experience.

CHOPE, H. D. The Rôle of Health Education in a Tuberculosis Testing Campaign. J. School Health. 7, 9:211 (Nov.), 1937.

Tuberculosis Goes to College—Sampling the incoming freshmen at a number of important universities it was found that 6 per 1,000 had adult type tuberculosis and that 30 per cent were tuberculin positive. On this basis there must be 6,000 college students with tuberculosis, and a third of a million with some form of tuberculous infection. Among high school students there must be 50,000 cases of tuberculosis. The total cost of tuberculosis in these two groups alone exceeds a hundred million dollars.

FERGUSON, L. H. A Five Year Review of Tuberculosis in College Students. Am. Rev. Tuberc. 36, 4:478 (Oct.), 1937.

May This Good Work Go On—This committee points out that some commercial interests are stressing excessively low summer temperatures, permitting too great air velocities, and failing to employ dehumidifying devices. Comfort and health alike are jeopardized. You're telling us, committee!

HAYHURST, E. R., *et al.* Equipment for Air Conditioning. A.J.P.H. 109, 22:1802 (Nov. 27), 1937.

As Guards Go Down—Of a thousand plus students entering a middle west university more than a quarter had not been vaccinated; a third had only slight immunity; 61 per cent were in some degree susceptible to smallpox. Not a wholesome picture.

HUSBAND, M. W., and LOY, D. T. Immunity to Smallpox. J.A.M.A. 109, 22:1797 (Nov. 27), 1937.

Continuing Southern Sanitary Problem—Sampling the rural population in North Carolina, a hookworm infestation incidence of 12 per cent among the whites was revealed. In the same counties the Rockefeller Sanitary Commission found a 36 per cent incidence some twenty-five years ago. It is evident that much work remains to be done before the last worm is unhooked.

KELLER, A. E., *et al.* The Present Status of Hookworm Infestation in North Carolina. Am. J. Hyg. 26, 3:437 (Nov.), 1937.

While School Children Are Weighed and Measured—Though commending the arm-girth, chest-depth, hip-width measures, the author points out that they, like other methods of judging nutritional status, have their limitations, but come closest to measuring the true health of the child.

KLEINSCHMIDT, E. E. What Standards Should Be Used in Determining the Nutritional Status of School Children? J. School Health. 7, 9:216 (Nov.), 1937.

Educating Health Workers—Three projects for continuing staff education are under way in Kentucky. The first group is the state department personnel, the second, the county health

workers, and the third is for allied groups, physicians, nurses, educators, social workers, etc. Each project has a separate committee carrying out independent plans.

McCORMACK, A. T., and HARRIS, R. F. Kentucky's Plan for Public Health Education. Pub. Health Rep. 52, 44:1530 (Oct. 29), 1937.

Last Word in Diphtheria Prophylaxis—Although we have not yet sufficient evidence to determine the one best way to immunize against diphtheria, the man who should know most about the subject suggests that two doses, one of alum precipitated and one of fluid toxoid will give the best results.

PARK, W. H. Duration of Immunity Against Diphtheria Achieved by Various Methods. J.A.M.A. 109, 21:1687 (Nov. 20), 1937.

Leadership for Modern Health Objectives—Although the Surgeon General was speaking to nurses, his discussion applies equally to other public health workers and should be required reading for all. He said that until research produces new knowledge, it is by striving against syphilis, tuberculosis, cancer, pneumonia, infant and maternal mortality that the greatest savings in mortality can be made. Far more use of public health nursing should be made than has been made in the past.

PARRAN, T. Public Health Nursing Marching On. Pub. Health Nurs. 29, 11:617 (Nov.), 1937.

About V. D.—How venereal diseases are combated on a grand scale in New York City is told by the health officer. The plan includes vastly increased diagnostic and treatment services, epidemiologic investigations, educational activities, and reporting.

RICE, J. L. Combating Syphilis and Gonorrhea. New York State J. Med. 37, 21:1822 (Nov.), 1937.

School Health Education By Whom?—Suppose a group of orthopedists decided that the children under their care needed some general educational services, so they call in an educator to the hospital at the beginning of the year to tell them what to do about their educational problems. Would the school man be flattered? Would he feel that the problem could be solved so? It is high time, the author says, to stop talk and to begin doing in the matter of preventive medicine in the school program.

SMILEY, D. F. The Preventive Medical Versus the Physical Training Approach to School Health Problems. J. School Health. 7. 9:214 (Nov.), 1937.

Heaven Lies About Us in Our Infancy—Providing a time table for physicians who may want to immunize the helpless infants, among the families in their practice, against smallpox, diphtheria, scarlet fever, pertussis, and typhoid fever, the authors consider the addition of a tuberculin test to the lengthening list of punctures.

STEWART, C. A., and PLATOU, E. S. Communicable Disease Control in Private Practice. J.A.M.A. 109, 19:1520 (Nov. 6), 1937.

Tuberculosis Contacts—South or north, city or country, household exposure to open tuberculosis produces the disease in about the same proportion of contacts. In this Tennessee study, slightly more than 1 per cent per year in the 10 year period following exposure were recorded—about the same as noted in Philadelphia and North Carolina.

STEWART, H. C., *et al.* Tuberculosis Studies in Tennessee. Am. J. Hyg. 26, 3:527 (Nov.), 1937.

ASSOCIATION NEWS

Executive Board Meeting

THE following is a brief resumé of the discussions and actions of the Executive Board at its meeting on December 17.

There were present:

John A. Ferrell, M.D., *Chairman*
J. N. Baker, M.D.
Louis I. Dublin, Ph.D.
John P. Koehler, M.D.
Arthur T. McCormack, M.D.
Thomas Parran, M.D.
John L. Rice, M.D.
Huntington Williams, M.D.
Abel Wolman, Dr.Eng.
Reginald M. Atwater, M.D., *Executive Secretary*

The appointment of Gregoire F. Amyot, M.D., D.P.H., as Administrative Associate in the study of State Health Facilities, effective January 1, 1938, was confirmed. Dr. Amyot was formerly Assistant Health Officer, Provincial Board of Health, Vancouver, B. C., Canada.

The 1939 Annual Meeting city will be selected from the Central or the Northeast area. The cities in the Central area are Louisville, Chattanooga, Columbus, Cincinnati, and Pittsburgh. Those in the Northeast area are Baltimore, Washington, Newark, Philadelphia, New York City, and Atlantic City.

New appointments of Fellows to the Committee on Research and Standards were confirmed as follows:

Margaret G. Arnstein, R.N. (1940)
Richard A. Bolt, M.D. (1940) reappointment
Walter S. Frisbie (1938)
A. Parker Hitchens, M.D. (1940)
John F. Norton, Ph.D. (1940) reappointment
Clair E. Turner, Dr.P.H. (1940) reappointment

As provided in the By-laws, the following appointments were made by the Sections indicated to the Committee on Eligibility and were confirmed. These terms expire in 1939.

Mary V. Dempsey, Vital Statistics Section
Emery R. Hayhurst, M.D., Industrial Hygiene Section
George D. Lummis, M.D., Health Officers Section
Agnes J. Martin, R.N., Public Health Nursing Section
Charles F. Wilinsky, M.D., Child Hygiene Section

The Executive Board considered and approved a long list of appointments to Association and Section Committees to be published in full in the 1937-1938 *Year Book*.

C. C. Young, Dr.P.H., Director of Laboratories, State Department of Health, Lansing, Mich., was declared elected to fill a vacancy on the Governing Council, with term expiring in 1938.

Approval was given to the request of the Health Officers Section for conducting an Institute for Health Officers in connection with the Kansas City Annual Meeting.

A progress report was received from the Exploratory Committee of the Executive Board charged with a study of the Public Health Aspects of Medical Care.

The Executive Secretary was empowered to appoint a committee to serve with the Section Secretaries as a Program Committee.

A plan governing the publication of the *American Journal of Public Health* was approved and an Editorial Board of five Fellows was named. These selections will be announced when acceptances have been received. Dr. Mazÿck P. Ravenel was designated Editor, and the Executive Secretary was appointed Managing Editor.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Asa Barnes, M.D., Kennett, Mo., District Health Officer, State Board of Health

John W. E. H. Beck, M.D., State Health Dept., Austin, Tex., Director, Local Health Services

William R. Cameron, M.D., C.P.H., King St., Hagerstown, Md., Washington County Health Officer

Bernard Greenberg, M.D., 1934 Bergen St., Brooklyn, N. Y., Borough Chief, Bureau of Preventable Diseases, New York City Department of Health

Robert M. Matts, M.D., Box 207, Yuma, Ariz., Director, Yuma County Health Service

Henry G. Steinmetz, M.D., 104 S. Indiana Ave., Bloomington, Ind., Director, District Health Department, State Board of Health

Thomas L. Waggoner, M.D., 208 S. Park, San Angelo, Tex., Director, District Health Dept., State Department of Health

Laboratory Section

Raul Ferramola, Corrientes 4317, Buenos Aires, Argentina, S. A., Bacteriologist, Obras Sanitarias de la Nacion

Archibald M. Fitz-Randolph, 915 Fifth Ave., Asbury Park, N. J., Bacteriologist, Monmouth County Local Health Unit #1

Agnes C. Hamann, 333 E. 68 St., New York, N. Y., Laboratory Assistant, Dept. of Health

Dora Snyder, City Laboratory, Lubbock, Tex., City Bacteriologist

Eugenio Suarez, M.D., Instituto Bacteriologico, Santiago, Chile, S. A., Director

Vital Statistics Section

John P. Mills, 393–7th Ave., New York, N. Y., Assistant Superintendent, Equitable Life Assurance Society

Edward S. Weiss, 329 Catherine St., Ann Arbor, Mich., Student

Public Health Engineering Section

Clayton H. Billings, Floydada, Tex., District Sanitarian, State Dept. of Health

Frank J. Brands, 388 St. Johns Place, Brooklyn, N. Y., Veterinarian, Dept. of Health

Leigh I. Holdredge, 27 Ford Ave., Oneonta, N. Y., District Sanitary Engineer, State Dept. of Health

Robert F. Killeen, 702 E. Ellsworth St., Midland, Mich., Sanitarian, Midland County Health Dept.

Leonard A. Lankford, County Health Dept., Dallas, Tex., Sanitarian

Albert W. Petty, 201 Haughton St., Williamston, N. C., District Sanitarian, State Board of Health

Vernon G. Weit, 465 W. Huron St., Pontiac, Mich., City Sanitarian

Industrial Hygiene Section

Nehemiah Janko, M.D., 25 Marble Hill Ave., New York, N. Y., Practising Physician

Food and Nutrition Section

Edward A. Crawford, 415 N. Caroline St., Herkimer, N. Y., Inspector of Foods, New York City Dept. of Health

Harry D. Kruse, M.D., Sc.D., 40 Wall St., New York, N. Y., Nutrition Survey, Milbank Memorial Fund

Flavius A. Newkerk, 52 Watkins Ave., Middletown, N. Y., Inspector of Foods and Drugs, New York City Dept. of Health

Meyer Schubert, 601 W. 162 St., New York, N. Y., Inspector of Foods, Dept. of Health

Child Hygiene Section

Richard F. Boyd, M.D., State Board of Health, Topeka, Kans., Assistant Director, Division of Child Hygiene

Ernest Buffone, M.D., 1705–78 St., Brooklyn, N. Y., Medical Inspector, School Hygiene, Dept. of Health

Van C. Tipton, M.D., 812 Avondale Rd., Austin, Tex., Field Director, Maternal and Child Health, State Dept. of Health

Public Health Education Section

Weyman C. Huckabee, 323 Zakoba Machi, Hiroshima, Japan, Director, Fukushima Cho Public Health Center (At present—Student at Yale University)

Milton I. Levine, M.D., 41 W. 96 St., New York, N. Y., Director of Study on Tuberculosis Immunization, Bureau of Laboratories, Dept. of Health

Vonda M. Roach, 118 W. Shaw, Tyler, Tex., Nurse, Tyler-Smith County Health Unit

Mildred Schpeiser, 655 Barbey St., Brooklyn, N. Y., Health Education Worker, Queensboro Tuberculosis and Health Association

Verna L. Stanford, 118 W. Shaw, Tyler, Tex., Nurse, Tyler-Smith County Health Unit

Public Health Nursing Section

Bertha L. Allwardt, 333 E. 30 St., New York, N. Y., Nursing Field Representative for New York State, American Red Cross

Gladys L. Crain, R.N., 81 Strathmore Rd., Brighton, Mass., Nurse Epidemiologist, State Dept. of Public Health

E. Hazel Golly, 711 N. Jay St., Rome, N. Y., State Staff Nurse, State Dept. of Health

Anna E. O'Brien, R.N., 1310 State St., Schenectady, N. Y., General Director, Public Health Nursing Association of Schenectady County

Lucille Perozzi, R.N., 816 Oregon Bldg., Portland, Ore., Educational Director, Division of Public Health Nursing, State Board of Health

Anna L. Pick, 42 S. Grand St., Cobleskill, N. Y., County Nurse

Frances A. Valliant, R.N., 1421 Madison Ave., New York, N. Y., Student at present

Mary J. Wallace, 1917 Washtenaw, Ann Arbor, Mich., County Nurse, Michigan Dept. of Health

AuVerne Ware, R.N., 726 N. Beacon St., Dallas, Tex., County Public Health Nurse

Margaret M. Whalen, R.N., 65 Broad St., Rochester, N. Y., District State Supervising Nurse, State Dept. of Health

Epidemiology Section

Harry S. Lichtman, M.D., 8735 Bay Parkway, Brooklyn, N. Y., District Diagnostician, Dept. of Health

Harold M. Williams, M.D., City Hall Annex, Fort Worth, Tex., Epidemiologist, Dept. of Health

Unaffiliated

Alfred Koerner, M.D., 53 E. 96 St., New York, N. Y., Inspector, Dept. of Health

John Neilson, Jr., M.D., 122 E. 42 St., New York, N. Y., General Practitioner

Paul T. Salchow, M.D., 956 Pingree Ave., Detroit, Mich., Student at present

Wells O. Stephens, Jr., D.D.S., Gregg County Health Unit, Longview, Tex., Director of Dental Service

Allan A. Twichell, 310 Cedar St., New Haven, Conn., Technical Secretary, Committee on Hygiene of Housing, American Public Health Association

EMPLOYMENT SERVICE

The Employment Service will register persons qualified in the public health field without charge. Public health nurses are registered with the Joint Vocational Service, 122 E. 22 Street, New York, N. Y., with which the Association coöperates.

Replies to these advertisements, indicating clearly the key number on the envelope, should be addressed to the American Public Health Association, 50 W. 50 Street, New York, N. Y.

POSITIONS AVAILABLE

The U. S. Civil Service Commission announces an unassembled examination for the positions of Principal Consultant in Child Welfare Services at $5,600 a year, and Principal Consultant in Medical Social Work for Children at $5,600 a year. Applications must be on file by January 10. Circular No. 3 may be obtained from the Civil Service Commission in Washington or any first class post office.

POSITIONS WANTED

HEALTH OFFICERS

Experienced physician, administrator, epidemiologist, and teacher, now employed, with C.P.H. from Johns Hopkins and 14 years' public health background, will consider position. Prefers epidemiology in city or state department. Excellent references. **A355**

Physician, M.D., Johns Hopkins; public health course at Michigan; experienced in school and city health work, will consider an administrative post in eastern United States. A354

Physician, M.D., Western Reserve; short course for health officers, Johns Hopkins; with county and state experience, wishes administrative or epidemiological position; north or west preferred. **A349**

Physician, M.D., Yale, completing M.P.H. at Columbia; good clinical background; will consider appointment in child health, epidemiology or public health administration. A350

Physician, M.D., Northwestern University; Dr.P.H., Yale; will consider appointment in general administration, infant welfare or epidemiology. **A300**

Experienced Health Officer who has completed Vanderbilt short course, 1936, will consider appointment. West preferred. **A320**

Physician, M.D., University of Maryland; C.P.H., Johns Hopkins; broad experience in county public health administration, will consider opening of better class. **A346**

CHILD HYGIENE

Woman physician, M.D., Rush Medical; Wishes administrative or clinical position in maternal and child health. **C347**

Woman physician, M.D., Yale; Dr.P.H., Yale; experienced in pediatrics and administration of state bureau, will consider attractive opening. **C348**

STATISTICIAN

Young man with 8 years' experience in public health statistics in well known national organization, and degree in Business Administration, now employed, will consider statistical position or combination with office administration. **A310**

MISCELLANEOUS

Dentist, graduate of Temple University, with excellent post-graduate experience, desires position in administrative aspects of dental hygiene. **M352**

Woman with excellent preparation and wide experience in health education field; organization, administration, supervision and program-making in city, rural and state work. Now employed but would consider good opportunity. $3,500 minimum. **M316**

Bacteriologist with training at C.C.N.Y., N.Y.U. and Cornell Medical College, wishes laboratory position in bacteriology; East or Southwest. **M351**

Experienced teacher, B.S., Massachusetts Institute of Technology; graduate courses Harvard School of Public Health, wishes teaching position or will consider statistical or health education opportunity. **M353**

NEWS FROM THE FIELD

UNITED STATES CONFERENCE OF MAYORS

THE United States Conference of Mayors made public the report of its National Health Officers Qualifying Board created early in 1937 under a resolution enacted at the 1936 Annual Conference. This board, consisting of leading public health authorities of the United States, was established for the specific purpose of formulating the professional qualifications which commissioners of public health in the larger cities of the nation should have. The job was undertaken as the first step in the long-term program of the Conference of Mayors in improving the professional qualifications for those who hold important municipal offices throughout the country.

The membership of the National Health Officers Qualifying Board of the Conference of Mayors is as follows:

Joseph W. Mountin, M.D.,* *Chairman*
Allen W. Freeman, M.D.*
John L. Rice, M.D.*
Wilson G. Smillie, M.D.*
Huntington Williams, M.D.*
Carl V. Reynolds, M.D.†
Edward S. Godfrey, Jr., M.D.*

The committee's report, which has been awaited by the medical and public health professions, provides for the following technical qualifications for chief municipal health officers:

QUALIFICATIONS FOR CITY HEALTH OFFICERS

Grade I

(Applicable, in general, to cities of 500,000 population and over.)

The minimum qualifications for health officers in this class shall consist of:

Graduation in medicine from a Grade A Medical School and not less than 6 years' full-time experience in public health work, 3 years of which must be in a responsible administrative position; 2 of the 3 years of general experience may be substituted by a course in public health of not less than 1 scholastic year in residence at a recognized institution of learning.

Grade II

(Applicable, in general, to cities of from 100,000 to 500,000 population.)

The minimum qualifications for health officers in this class shall consist of:

Graduation in medicine from a Grade A Medical School and not less than 4 years' full-time experience in public health work, 1 year of which must be in a responsible administrative position; 2 of the 3 years of general public health experience may be substituted by a course in public health of not less than 1 scholastic year in residence at a recognized institution of learning.

Grade III

(Applicable, in general, to cities under 100,000 population.)

The minimum qualifications for health officers in this class shall consist of:

Graduation in medicine from a Grade A Medical School and not less than 2 years of full-time experience in public health work, or, 1 year of such full-time experience and the completion of a course in public health of not less than 1 year in residence at a recognized institution of learning.

The board will act, at the request of any city, to determine whether candidates for the office of health commissioner, possess the qualifications adopted by the board. If so, the board will certify to the city this fact.

It is noteworthy that the qualifications for public health officers for the first time impose definite and specific medical and *public health* training and experience.

* Fellow A.P.H.A.
† Member A.P.H.A.

President LaGuardia, in commenting on the report, said:

"We are now beginning to make progress. If every city will adopt the recommendations now made by our special public health committee, we can avoid having the so-called "pill doctor" or the family physician appointed to the important office of Commissioner of Health. Public health administration involves factors requiring personnel with *public health* experience and not only just general medical training. Consequently, if we can establish accepted standards or qualifications which all persons must have who seek the highest public health position in a city, we are insuring a real merit system.

"We have taken public health first because we have had the coöperation of the public health profession itself. We shall next establish committees in other fields—finance, fire, police, etc., and endeavor to develop qualifications for the major posts in the municipal service in these fields. Reformers have been talking for fifty years about the merit system. But it has remained for the mayors, acting collectively, to make the first real contribution in professionalizing the public service, in so far as the highest municipal offices are concerned."

The following resolution was passed:

QUALIFICATIONS FOR MUNICIPAL HEALTH OFFICERS

WHEREAS, the United States Conference of Mayors has now received the report of its committee of seven outstanding public health authorities, and

WHEREAS, this report sets up standard professional qualifications for Commissioners of Health in the larger cities of the country, therefore be it

RESOLVED, that the United States Conference of Mayors recommend to the cities of the country that the suggested standard qualifications for health officers be followed by all cities when appointments to the office of Health Commissioner are made in the future.

CONFERENCE ON MATERNAL AND CHILD WELFARE

A CONFERENCE on the theme of "Better Care for Mothers and Babies" has been called by Katharine F. Lenroot,† Chief of the Children's Bureau, U. S. Department of Labor, to be held in Washington, D. C., January 17–18.

The Planning Committee appointed for the conference includes representatives of many national agencies, among them the American Public Health Association.

Miss Lenroot states that the problem of maternal care and care of the newborn continues to be a matter of grave concern to the people of this country. No matter what method of statistical procedure is used to assign cause to maternal deaths, the United States retains an exceedingly high maternal mortality rate as compared with other countries. In 1935 the number of maternal deaths due directly to pregnancy and childbirth was 12,544. Additional deaths of pregnant women due to other primary causes raised the total number to 14,296. The number of stillbirths in 1935 was 77,119, and the number of babies dying in the first month of life as the result of causes arising during pregnancy or at time of delivery was 56,262. This means that the total number of deaths of mothers, stillbirths, and deaths of babies in the first month of life from causes associated with maternal conditions was 147,677 for the single year of 1935.

The forthcoming conference will canvass in a broad way the resources now available and the work now being done in behalf of mothers and babies throughout the country through the coöperative efforts and under the leadership of the medical profession, public health officials, nursing organizations, professional and lay groups, and interested individuals. It should furnish an opportunity for fruitful discussion and sound planning.

---

* Fellow A.P.H.A.
† Member A.P.H.A.

PNEUMONIA FILM

A NEW film on pneumonia, "A New Day," has been made in Hollywood by a professional cast. It had its premier public showing at the Radio City Music Hall in New York, December 16.

The new picture was sponsored by the U. S. Public Health Service and produced by the Metropolitan Life Insurance Company. It is introduced by a brief talk by New York City Health Commissioner John L. Rice.*

PNEUMONIA ADVISORY COMMITTEE

TO plan a program for pneumonia control on a national scale, Thomas Parran, M.D.,* Surgeon General of the U. S. Public Health Service, recently appointed an Advisory Committee, which held its first meeting November 12, in Washington, D. C.

Members of the Committee are:

Donald B. Armstrong, M.D.,* Metropolitan Life Insurance Company, New York, N. Y.

David P. Barr, M.D., Washington University School of Medicine, St. Louis, Mo.

Russell L. Cecil, M.D., Cornell University Medical School, New York, N. Y.

Lloyd D. Felton, M.D.,† Johns Hopkins University School of Medicine, Baltimore, Md.

Alfred Friedlander, M.D.,† University of Cincinnati College of Medicine, Cincinnati, O.

Roderick Heffron, M.D.,† Commonwealth Fund, New York, N. Y.

Ernest E. Irons, M.D., Rush Medical College, Chicago, Ill.

Roger I. Lee, M.D., Consultant in Internal Medicine, Boston, Mass.

George H. Ramsey, M.D.,* New York State Department of Health, Albany, N. Y.

Y.M.C.A. SYPHILIS CAMPAIGN

THE National Council of the Young Men's Christian Association has issued a bulletin urging local units to coöperate with physicians and health officials in the drive against syphilis.

The local units are urged to take specific steps for investigation, education and arrangements with physicians for Wassermann tests.

NEW MEXICO PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

THE following new officers were elected by the New Mexico Public Health Association at its annual meeting held in November:

President—William W. Johnston, M.D.,* Las Vegas, N. M.

Vice-President—Helen B. Fenton, R.N.

Secretary-Treasurer—James R. Scott, M.D., Ph.D.,* Albuquerque, N. M.

PENNSYLVANIA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

THE Pennsylvania Public Health Association has elected new officers as follows:

Honorary President — Edith MacBride-Dexter, M.D.,† Harrisburg, Pa.

President—John M. J. Raunick, M.D.,* Harrisburg, Pa.

First Vice-President—Harold H. Keller,† Philadelphia, Pa.

Second Vice-President—H. W. Banks, M.D., Prospect Park, Pa.

Secretary-Treasurer—Arthur M. Dewees,† Philadelphia, Pa.

Executive Secretary—Thomas Shriver.

Representative to the Governing Council, A.P.H.A.—Henry Field Smyth, M.D., Dr.P.H.,* Philadelphia, Pa.

FLORIDA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

THE Florida Public Health Association elected the following new officers for 1938 at its recent annual meeting:

President—N. A. Upchurch, M.D.,* Jacksonville, Fla.

First Vice-President—L. J. Graves, M.D., Tallahassee, Fla.

Second Vice-President—Lalla M. Goggans, R.N.,† Jacksonville, Fla.

Secretary-Treasurer—Edward M. L'Engle, M.D.,† Jacksonville, Fla.

Representative on A.P.H.A. Governing Council—William H. Pickett, M.D.,* Pensacola, Fla.

---

* Fellow A.P.H.A.
† Member A.P.H.A.

SOUTHERN BRANCH A.P.H.A. ELECTS OFFICERS

AT its Sixth Annual Meeting, the Southern Branch of the American Public Health Association elected the following new officers:

President—James A. Hayne, M.D.,* Columbia, S. C.

First Vice-President—H. A. Kroeze, B.C.E.,† Jackson, Miss.

Second Vice-President—Frances F. Hagar, R.N.,* Nashville, Tenn.

Third Vice-President—Martin R. Beyer, M.D.,† Oklahoma City, Okla.

Secretary-Treasurer—G. Foard McGinnes, M.D.,* Richmond, Va.

NEW JERSEY HEALTH ASSOCIATION

AT the Sixty-third Annual Meeting of the New Jersey Health and Sanitary Association, held at Princeton, N. J., December 10–11, new officers were elected as follows:

President—William H. MacDonald, M.S.,† Trenton, N. J.

First Vice-President—Joseph R. Morrow, M.D., Ridgewood, N. J.

Second Vice-President—Leverett D. Bristol, M.D., Dr.P.H.,* New York, N. Y.

Third Vice-President—L. Van D. Chandler,* Hackensack, N. J.

Secretary—Edward Guion, M.D.,* Northfield, N. J.

Treasurer—Budd H. Obert,* Asbury Park, N. J.

John Hall, B.S.,* of Freehold, N. J., continues as Executive Secretary.

MICHIGAN PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

AT its recent annual meeting, new officers of the Michigan Public Health Association were elected as follows:

President—Carleton Dean, M.D., C.P.H.,* Charlevoix, Mich.

Vice-President—John L. Lavan, M.D.,* Grand Rapids, Mich.

Secretary-Treasurer—Marjorie Delavan,* Lansing, Mich.

Representative on A.P.H.A. Governing Council—C. C. Slemons, M.D.,* Lansing, Mich.

PERSONALS

Central States

VICTOR E. LEVINE, M.D., Professor of Biological Chemistry and Nutrition and head of the Department, Creighton University School of Medicine, Omaha, Nebr., has established a medical and biological laboratory in the Arctic, at Point Barrow, Alaska, as a coöperative research project of the U. S. Public Health Service and Creighton University. Dr. Levine, with an Assistant, DELBERT F. FOORD, of the University of California, arrived in Alaska in August and expects to remain a year.

HUGH B. ROBINS, M.D.,† of Marshall, Mich., Associate Director of the Calhoun County Health Department, has been placed in charge of the Department, succeeding DR. MATTHEW R. KINDE,† who is now at the W. K. Kellogg Foundation, Battle Creek.

DR. CHARLES B. STEPHENS, of Iola, Kans., has been appointed Health Officer of Topeka.

Eastern States

HAZEL DUDLEY, R.N., has become Director of the Division of Public Health Nursing in the Connecticut State Department of Health, as of December 1. Miss Dudley previously was on the staff of the Henry Street Nursing Service, New York, N. Y.

CHARLES KURTZHALZ, of Chester, Pa., formerly Executive Secretary of the Delaware County Tuberculosis Association, has been appointed Executive Director of the Philadelphia Health Council and Tuberculosis Committee, to succeed the late HARVEY D. BROWN, PH.D.†

ANNA L. TITTMAN, R.N.,† Vocational Secretary for Public Health Nursing, Joint Vocational Service, New York,

* Fellow A.P.H.A.
† Member A.P.H.A.

N. Y., has become the Executive Director of the Nurse Placement Service, 8 South Michigan Boulevard, Chicago, Ill., as of January 1.

Southern States

DR. GEORGE W. BAKER, of Walters, Okla., has been appointed Health Superintendent of Cotton County.

MONROE F. BROWN, M.D.,† of Fayetteville, Tenn., has been appointed to succeed FRANK L. ROBERTS, M.D.,† as Health Officer of Gibson County, with headquarters in Trenton.

DR. CHARLES M. COLE, of Chatom, Ala., has been appointed Health Officer of Washington County, succeeding DR. ISAAC C. SUMNER, of Chatom.

DR. WARREN A. COLTON, Clinical Director of the Veterans' Administration Facility, Kecoughtan, Va., has been named Chief Medical Officer, to succeed DR. EDWARD N. SCHILLINGER, who was recently transferred to Atlanta.

DR. EVA F. DODGE, of Winston-Salem, N. C., has been appointed to direct and organize antepartum clinics throughout Alabama for the Alabama State Department of Health. Headquarters will be in Montgomery, Ala.

DR. HARVEY C. HARDEGREE, recently on the staff at Excelsior Springs, Mo., has been appointed Clinical Director of the Veterans' Administration Facility, of Kecoughtan, Va., to succeed DR. WARREN A. COLTON.

DR. JESSIE M. HARRIS, of Wilberton, Okla., has been appointed Health Superintendent of Latimer County.

JAMES G. MCALPINE, PH.D.,† has resigned as Director of Laboratories, Alabama State Department of Health, Montgomery, Ala.

DR. SHADE D. NEELY, of Muskogee, Okla., has been appointed Health Superintendent of Muskogee County, to succeed DR. CHARLES E. WHITE, of Muskogee.

DR. GAPPA M. RUSHING, of Durant, Okla., has been appointed Health Superintendent of Bryan County, to succeed DR. HENRY B. FUSTON, of Bochito.

DR. ISAAC C. SUMNER, of Chatom, has been appointed Assistant to the Health Officer of Mobile County, Ala.

DEATHS

FRANCIS B. GRINNELL, M.D., of the Department of Bacteriology and Immunology, Harvard University Medical School, Boston, Mass., Bacteriologist, died in England in November.

CHARLES E. KAUFMAN, M.D.,† Health Officer of West Haven, Conn., died December 3, at the age of 51.

* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Academy of Orthopaedic Surgeons. First West Coast Meeting. Hotel Biltmore, Los Angeles, Calif. January 16–20.

American Academy of Tuberculosis Physicians. San Francisco, Calif. June.

American Association of Medical Social Workers. Seattle, Wash. June 26–July 2.

American Association of Pathologists and Bacteriologists. Atlantic City, N. J. May 3–4.

American Association of Psychiatric Social Workers. Seattle, Wash. June 26–July 2.

American Association of Schools of Social Work. New Orleans, La. January 28–29.

American Chemical Society. Dallas, Tex. April 18–21.

American College of Physicians, Waldorf-Astoria Hotel, New York, N. Y. April 4–8.

American Home Economics Association. Pittsburgh, Pa. June 28–July 1.

American Institute of Nutrition. Baltimore, Md. Spring, 1938.

American Medical Association. San Francisco, Calif., June 13–17.

American Roentgen Ray Society. Atlantic City, N. J. September, 1938.

American Society of Clinical Pathologists. San Francisco, Calif. June 9–11.

American Society of Heating & Ventilating Engineers, 44th Annual Meeting. Hotel Biltmore, New York. January 24–28.

American Veterinary Medical Association. New York, N. Y. July 5–9.

American Water Works Association. Hotel Roosevelt, New Orleans, La. April 24–28.

Annual Congress of the Council on Medical Education and Hospitals of the American Medical Association. Palmer House, Chicago, Ill. February 14–15.

Association for the Study of Allergy. San Francisco, Calif. June 13–14.

Association for the Study of Internal Secretions. San Francisco, Calif. June 13–14.

Association of Foods and Drug Officials of South Central States. Biloxi, Miss. May, 1938.

Association of Western Hospitals. San Francisco, Calif. February 28–March 3.

California Association of Health, Physical Education and Recreation. Pasadena, Calif. April 18–19.

California Conference of Social Work. Pasadena, Calif. April 24–28.

California Medical Association. Pasadena, Calif. May 9–12.

Central Physical Education Association. Minneapolis, Minn. March 30–April 2.

Child Labor Day—sponsored by National Labor Committee, 419 4th Avenue, New York. January 29.

Congress of American Physicians and Surgeons. Atlantic City, N. J. May 2–6.

Congress of Parent-Teachers Association. Battle Creek, Mich. April 20–22.

Connecticut Milk Producers Association. Hartford, Conn. January 14.

Dairy Products Association of the Northwest. St. Paul, Minn. April, 1938.

Federation of State Medical Boards of the United States. Palmer House, Chicago, Ill. February 14–15.

Fifth International Heating and Ventilating Exposition. Grand Central Palace, New York, N. Y. January 24–28.

Georgia Public Health Association. Atlanta, Ga. May, 1938.

Hawaii Territorial Medical Association. Honolulu, T. H. May, 1938.

Hay Fever Association of America. Sault Ste. Marie, Mich. August 10–September 20.

Illinois Dairy Products Association. Springfield, Ill. February 22–24.

International Association for Dental Research. Minneapolis, Minn. May 12–13.

International Association of Medical Museums—American and Canadian Section. Atlantic City, N. J. February 28–March 2.

Iowa Public Health Association. Des Moines, Ia. May, 1938.

Iowa Tuberculosis Association. Ottumwa, Ia. March, 1938.

Manufacturing Chemists Association of the United States. Sky Top, Pa. June 2–3.

Massachusetts Public Health Association. Boston, Mass. January 27.

Maternal and Child Welfare Conference—"Better Care for Mothers and Babies." Sponsored by Children's

Bureau, U. S. Department of Labor. January 17–18.

Medical Library Association. Boston, Mass., June, 1938.

National Association for Educational Publicity. Atlantic City, N. J. February 26–27.

National Conference of Social Work. Seattle, Wash. June 26–July 2.

National Conference on Weights and Measures. Washington, D. C. June, 1938.

National Education Association. New York, N. Y. June 26–30.

National Tuberculosis Association's Institute for the Training of Tuberculosis Workers—to be held under the auspices of New York University. New York Tuberculosis and Health Association, 386 Fourth Avenue, New York. January 31–February 12.

National Warm Air Heating and Air Conditioning Association. New York, N. Y. January 24–26.

New England Hospital Association. Boston, Mass. March 10–12.

New York Diabetes Association (of the New York Tuberculosis and Health Association). Series of 6 weekly lectures for physicians on Diabetes Mellitus. Admission free. New York Academy of Medicine. January 20–February 24, incl.

New York Heart Association—Annual Meeting. New York Academy of Medicine. January 18.

Ohio Federation of Public Health Officials. Columbus, Ohio, April, 1938.

Pan American Medical Association—Seventh Cruise Congress to Havana. (Pan American Medical Association, 745 Fifth Avenue, New York, N. Y.) January 15–31.

Pennsylvania Public Health Association. Harrisburg, Pa. May, 1938.

Public Health Association of New York City. New York. April, 1938.

Second National Social Hygiene Day. Theme, "Stamp Out Syphilis—Foe of Youth." February 2.

Social Work Publicity Council. Seattle, Wash. June 26–July 2.

South Carolina Public Health Association. Myrtle Beach, S. C. May 23–25.

Symposium on Higher Education in the South. Vanderbilt University, Nashville, Tenn. February 5.

United Fresh Fruit and Vegetable Association. New Orleans, La. January 10–13.

Western Branch, American Public Health Association. Hotel Multnomah, Portland, Ore. June 6–8.

FOREIGN

World Conference on Leprosy. International Leprosy Association. Cairo, Egypt. March 21.

American Water Works Association—Canadian Section. Windsor, Ont., Canada. March 23–25.

International Congress on Rheumatism and Hydrology. Oxford, England. March 26–31.

Industrial Accident Prevention Associations, Inc. Windsor, Ont., Canada. April 28–29.

International Congress of Obstetrics and Gynecology. Amsterdam, The Netherlands. May 4–8.

Scientific Congress of Doctors and Dentists—"ARPA." Prague. July 21–25, 1938.

British Dental Association. Belfast. July 29–August 3.

Fifth International Congress for Experimental Cytology. Zurich, Switzerland. August 7–12.

International Meeting for Cell Research. Anatomical Institute, Zurich, Switzerland. August 7–13.

Sixteenth International Physiological Congress. Zurich, Switzerland. August 14–18.

British Association for the Advancement of Science. Cambridge, England. August 17–24.